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CLINICAL NOTES

ON

DISEASES OF THE LARYNX.

LONDON: PRINTED BY
SPOTTISWOODE AND CO., NEW-STREET SQUARE
AND PARLIAMENT STREET

Drawing of a larynx taken after death, exhibiting the swollen or thickened form of laryngeal phthisis.
Male. Age 16.

Drawing of a healthy larynx taken after death.
Female. Age 23.

lol ad nat. W. West.

CLINICAL NOTES

ON

DISEASES OF THE LARYNX

INVESTIGATED AND TREATED WITH
THE ASSISTANCE OF

THE LARYNGOSCOPE.

BY

WILLIAM MARCET, M.D., F.R.S.

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BIBLIOTHECA BODLEIANA

LONDON:
LONGMANS, GREEN, AND CO.
1869.

157. o. 182.

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INTRODUCTION.

On my being appointed Assistant-Physician to the Hospital for Consumption and Diseases of the Chest, Brompton, it appeared to me that the practice in the out-patient department of that Hospital offered an important and wide field for the investigation and treatment of Diseases of the Larynx with the aid of the Laryngoscope; especially with respect to laryngeal phthisis. I have availed myself of the opportunity thus afforded, and the following pages are mainly intended to supply a record of these observations.

We are in possession of several excellent works on the use of the Laryngoscope, and on laryngeal diseases observed and treated with the assistance of this instrument. Amongst these I may mention one by Sir Duncan Gibb, and another by Dr. Morell Mackenzie. Both these gentlemen have added considerably towards our knowledge of diseases of the throat, and of their treatment. Sir Duncan Gibb has brought forward a large number of cases, many of which are of great interest. He has observed that bromide of ammonium, given internally, is very useful for the treatment of laryngismus stridulus—a disease which often proves difficult to manage. I had a recent opportunity of treating a case of this kind, the patient being a little girl, attend-

ing the Consumption Hospital as an out-patient. In accordance with my direction, she took small doses of bromide of potassium, and a few days later her mother called to say the child had had no return of the attacks. As she has not been brought back to me, it is probable that the cure has been permanent. There are other spasmodic affections of the larynx, besides laryngismus stridulus, in which it may be anticipated that bromide of ammonium or potassium will prove most beneficial. In advanced tuberculous disease of the larynx, Sir D. Gibb advocates the topical use of a solution of from two to four drachms of bromide of ammonium to one ounce of glycerine, applied with a curved brush.

Dr. Morell Mackenzie has done much towards the diagnosis and treatment of the nervo-muscular affections of the larynx, or of loss of voice from want of power of the muscles of the vocal cords, unattended with any organic disease. He has observed that in hysterical aphonia, loss of voice is generally owing to a weakness of the adductor muscles of the vocal cords, and that when the patient attempts to produce a sound the cords keep at a distance from each other, instead of coming into close approximation so as to vibrate under the influence of the blast from the chest. Dr. Mackenzie has obtained very satisfactory results from the treatment of these cases with the application of electricity to the cords by means of an instrument he has invented, and to the merit of which I can testify from practical use.

This gentleman has succeeded in ascertaining which are the different muscles and sets of muscles at fault

in nervous aphonia, and has thus, in a physiological as well as a pathological point of view, obtained a most important and interesting result.

Dr. George Johnson, the author of a small but highly practical manual on the use of the Laryngoscope, has been very successful with the removal of a number of morbid growths from the larynx, performed with the assistance of the Laryngoscope. His cases are reported in the 'Medico-Chirurgical Transactions for 1868,' and reflect much credit on the operator.

It is not my intention to allude to the history of the discovery of the Laryngoscope, which will be found fully described by other authors; but I think it right to recall the exertions and skill of Professor Czermak, to whom we are so greatly indebted for his having perfected the art of Laryngoscopy so as to make the Laryngoscope of easy and efficient application.

48 Harley Street, Cavendish Square.

CLINICAL NOTES

ON

DISEASES OF THE LARYNX.

PRELIMINARY REMARKS.

One of the main objects of the present Essay is to show the importance of the Laryngoscope and its use, not only as a means of diagnosing laryngeal affections and allowing of the application of local treatment to the larynx, but also as an instrument calculated to afford such knowledge from the inspection of the throat as will assist materially in the diagnosis and prognosis of pulmonary phthisis. Indeed, a very short acquaintance with this instrument will suffice to convince a medical practitioner of its great value; thus a cough may result from laryngeal irritation which, without the Laryngoscope, could never have been properly diagnosed, and which the application of astringents to the larynx may rapidly cure. Again, a cough due to some disturbance of the nervous system is not unlikely to mislead the practitioner, on account of its apparently laryngeal sound, when an examination with the Laryngoscope will at once dispel the idea of irritation of larynx, and, in the absence of pulmonary symptoms, suggest the true cause of the affection.

There are circumstances, however, which interfere

with the general adoption of the Laryngoscope; these are:—

1st. That a number of instruments are required, which, for practitioners residing in the country, may be difficult to procure.

2nd. That the time for a good laryngoscopic examination is, occasionally, inconveniently long.

3rd. That some degree of experience is necessary to apply the instrument to its best advantage; or to be able to introduce readily a camel-hair brush into the larynx, or scarify the proper place in a case of supraglottic œdema or tubercular disease of the epiglottis, or remove a laryngeal tumour; the instruments being guided entirely by their reflection in the laryngeal mirror, which alone is seen.

My answer to the first objection is that the instruments wanted are but few; the necessary arrangement need be made but once, and will be always ready for use.

The time required for the examination of the larynx is an objection which only holds good with those who cannot bear the presence of the Laryngoscope in the mouth, and between the fauces, without being seized with involuntary contractions of their pharyngeal muscles. I should say, from my experience, that there is some delay from this cause, with about one in every two or three patients submitted to examination for the first time. With most of them a little coaxing and gentle manipulation will overcome the difficulty, and no more than a very few minutes need be lost; with others I cause a few whiffs of chloroform to be inhaled, or syringe the throat with a solution of alum and chlorate of potash—five grains of each to one ounce of water, using Gibb's laryngeal syringe; when ice is at hand, or can be easily procured,

a few pieces retained in the back of the mouth, and some of it mixed with salt, and applied to the throat externally in a waterproof bag, will enable the pharynx to tolerate the presence of the mirror. Sir Duncan Gibb administers bromide of ammonium; but with the other means and a certain allowance of patience, I have, as a rule, succeeded on the first visit. I should say that, if everything be ready beforehand, a first laryngoscopic examination takes from five to twenty minutes. On the following visits the inspection of the larynx will usually be found much easier than on the first, and after a time the state of the larynx can be ascertained in a minute or two, and even in a few seconds. Among over a hundred outpatients at the Consumption Hospital, Brompton, I contrive to make a laryngoscopic inspection of a certain number of cases of laryngeal disease at nearly every sitting.

I have found want of time, requiring a hurried inspection of the larynx, a frequent cause of failure, so that the saying "more haste less speed" is essentially true in the present case; indeed, it should be borne in mind, in every laryngoscopic examination, that as a rule, it will be a saving of time to put off a first inspection if it must be done within ten minutes or a quarter of an hour, unless the patient's throat be able to bear at once the introduction of the mirror.

The acquirement of skill in the art of Laryngoscopy is the natural result of diligent perseverance in the use of the instrument, directed with intelligence. It is not so much by reading of the difficulties to be met with, and how they are to be overcome, as by acquiring the habit of finding out, practically, where the fault lies, that the present art is to be mastered; and I can only

assure the reader that the importance of the results, to say nothing of the interest and satisfaction to be derived from practice with the Laryngoscope, will amply repay for the time and labour expended in overcoming the difficulties with which beginners have invariably to contend.

ON THE FORMATION OF THE HUMAN VOICE.

The present Essay, obviously treating of affections of the voice, it is important, for a clear understanding of what is to follow, that I should commence with a few remarks on the act of phonation, or the formation of the voice. The utterance of human sounds is the exclusive function of the larynx. A sound can be obtained by blowing into a larynx, after it has been removed from the body, through a tube connected with the trachea, keeping the vocal cords in mutual contact and tightly stretched; if they are not close enough to each other, or if their tension should be insufficient, no sound will be produced. A similar experiment may be performed with a glass tube, over the opening of which two bands of caoutchouc are stretched, their edges meeting in a line with the tube's diameter. By blowing into the open end of the tube, a sound will be obtained. This phenomenon is accounted for as follows:—When air is blown into the windpipe, or a tube prepared for the experiment, it must force its way between the vocal cords, or the edges of the caoutchouc bands, and, by so doing, cause them to bulge outwards; but the air, now finding a freer exit, and the pressure being relieved, the cords or caoutchouc bands, from their elasticity, will immediately resume their former position. At the

same instant the blast, meeting afresh with resistance, will again move the parts aside, and, by that repeated action, the current of air will be divided into a number of sections, reaching the ear in a succession of waves, and thereby producing a vibration, perceived as a sound. The tone of this sound, as in the case of the organ-pipe, will depend upon the vibration of the air contained in the tube above the vibrating body, which, in the human individual, is represented by the mouth and nose.

The different notes are not due, as a rule, to a lengthening or shortening of the cords, but to alterations of their state of tension, much as the sound of a fiddle is changed by turning the string-pegs one way or the other ; and, if it be considered what very slight difference of tension is enough in a violin, or violoncello, to alter a note, there is no difficulty in conceiving the power of varying the voice-sounds to such an extent as to enable a singer to run over, for instance, two and a half octaves of the scale; the only wonder is, that the sounds are uttered in tune, or that the will should be possessed of such a degree of control over the muscles of the vocal cords as to induce their contraction precisely to the right extent for the notes required.

It is obvious that the same muscular action must produce respectively the same musical notes with the human voice, and, consequently, the vocal cords must be perfectly elastic. Clearly, the slightest loss of elasticity of the cords would prevent them from returning to their former state of tension on the relaxing of the muscular action ; hence would occur the production of false notes, or singing out of tune.

The act of singing well, or even of speaking in a

good pleasant voice, will require the following conditions;—

1st. The respiration must be free, so as to allow the chest to take up the average quantity of air required for the natural flow of sound.

2nd. The cavities of the mouth and nose must be in no way reduced in size; for instance, if the nose be alternately closed and open while a sound is being emitted, a difference in its tone will be perceived; an attack of coryza, by narrowing the nasal passage, is enough to produce an alteration of the voice.

3rd. The muscles concerned in the act of respiration must be in no way enfeebled, so as to give the necessary velocity to the air to produce the fortes and pianos of singing, and the proper intonation of speech. It has been observed by Lisconius and Lehfeldt that, with equal degrees of tension of the vocal cords, different sounds are produced, according to the force with which the air is blown out of the lungs. This, therefore, is an additional fact showing the importance of a healthy state of the pulmonary organs, as concerned with the art of singing.

4th. The vocal cords must be in no way congested or thickened, as in that case, although the action of the muscles which regulate their action may be perfect, still their elasticity will be interfered with, the sound uttered will consequently be out of tune and harsh. The present cause of hoarseness, or of want of power for singing, is of every day's occurrence. The common excuse of a cold when a lady is asked to sing will be at once accepted, when the effects of a slight degree of congestion of the vocal cords are taken into consideration, and if the lessened elasticity of the cords be united to the very natural timidity felt in singing before an

audience, a slight cold must be considered a fair reason for refusing to sing.

In the case of excessive exercise of the voice, as in preaching, or delivering long speeches, or teaching, the circulation of the larynx becomes very active, as invariably happens with any part of the body which is subjected to much use. It is very obvious that a sudden exposure to cold air, under these circumstances, will, by contracting the laryngeal capillaries, produce a state of congestion at the larynx, and hence the power of singing or speaking will be more or less impeded.

5th. The muscles of the vocal cords must be in a perfect state of health. This is very apparent, if it be considered how accurately these muscles must work for the normal production of sound. There are no less than four sets of muscles acting on the vocal cords: namely—those which stretch them, or the tensors; those which assist in relaxing the cords in antagonism to the former, or the laxors; then those which bring the cords into mutual approximation, or the adductors (consisting mainly of only one muscle); those drawing the cords away from each other or the abductors, which dilate the glottis in the act of respiration.

If the muscles concerned in the work of stretching the cords are weak and relaxed, the sound will be lowered, and its intonation in the act of speaking, and still more in singing, will be prevented. In case of a greatly reduced contractile power of the tensor muscles, the voice may be entirely wanting, or become limited to a very unpleasantly high pitch, uttered with much trouble. This is owing to the contractions of the glottis, both laterally and in its antero-posterior diameter: under these circumstances the act of phona-

tion will require great muscular exertion, and many words may be altogether dropped.

Should the muscles which assist in the relaxation of the cords fail, we may expect the passage from one sound to another to be imperfect, and the sound of the voice will possess too much uniformity.* If the muscles which draw the vocal cords towards each other (adductors) are deficient in their actions, no vibration can take place, and no sound at all will be produced; this being a frequent cause of Aphonia. If the muscles which draw the cords aside, to allow of the passage of air, become paralysed, the state of the voice will depend on the condition of the tensor muscles; at all events, a difficulty of breathing will be the result, which may become so severe as to threaten life, and require the performance of tracheotomy, a similar result being produced by a spasmodic state of contraction of the tensor muscles, which the abductors cannot overcome. Thus it is that, as a rule, unless the muscles of the vocal cords be all in a healthy condition, the voice will be either altered in pitch or altogether prevented.

The art of singing depends more especially on the possession of the power of using dexterously the laryngeal muscles in the production of sounds in good tune, by causing them to contract precisely to the extent necessary for the production of certain sounds; they will require exercising first, as the muscles of the fingers do for playing the pianoforte; with beginners, the fingers are stiff, and do not act according to the will, and running over the scale is a slow and laborious process, because the muscles of the fingers have not yet been taught to act rapidly and independently of each

* Paralysis or weakness of the laxor muscles of the vocal cords, is a condition difficult to determine by actual observation.

other. It is the same with the voice: the muscles concerned in that function must be taught and exercised; hence the difficulty experienced in singing in tune, in the right notes, and of passing quickly from one note to another. A great art in singing is, to hit the correct note without beginning higher or lower; the difficulty is owing to the fact that the ear will give the necessary directions to the laryngeal muscles to correct any bad sound, long before these muscles have become so educated as to act rapidly on the cords to the extent necessary to bring out at once the precise note required.

In falsetto singing, according to Müller, the distinguished German physiologist, the vibrations are confined to the very rim of the cords, while in the chest-note the whole breadth of the cord vibrates. Helmholtz thinks falsetto sounds are produced by the removal of the layer of mucus which habitually lies under and loads the vocal cords, their edges thus become sharper and their weight less, while, their elasticity remaining the same, they are shaken into more rapid tremors.*

The consideration of the head and chest notes is a subject highly interesting, and no less important in a practical point of view, as it does not unfrequently happen that, in cases of the so-called "cracked voice," the act of phonation is carried on partly or entirely with head-sounds. If the mechanical cause of the formation of head-notes be known, this will greatly assist us in diagnosing, even without the Laryngoscope, the state of the larynx in this affection, and, of course, in pointing out the best means towards its cure or relief.

I had an opportunity of witnessing a case of a remarkable falsetto voice, in which I was able to satisfy

* Tyndall, *Lectures on Sound.*

myself of the precise condition of the larynx by means of the Laryngoscope. The sound of this man's voice never altered into a chest-note, his speech was conducted in a series of "harmonic" sounds, beautifully clear and not altogether unpleasant, although particularly unusual. I obtained a very good view of this patient's vocal cords, and plainly saw that in the act of phonation its anterior halves were brought close enough to each other to enter into vibration, but the posterior half of the left cord failed to approach the corresponding half of the other close enough to allow these portions of the cords to vibrate under the direct action of the blast; the left cord appeared bent to the left, in the middle; the right one was not quite straight, the posterior half instinctively trying to meet its fellow, and bending a little to the left.

This was obviously the cause of the falsetto voice, as by applying a solution of nitrate of silver to the cords, the natural chest-voice was immediately restored. I now observed the cords to approach each other in a symmetrical way throughout their whole length, both being entirely submitted to the action of the air during phonation.

This patient suffered relapses, so that I had several opportunities of examining his vocal cords, and of confirming the present observation. I succeeded on every occasion in bringing back the chest-voice, and having lost sight of him for some weeks, thought him permanently cured. He returned, however, to me for a fresh, though not so complete, attack of his vocal affection. This time I observed that the anterior halves of the cords were at fault, and could not be drawn [illegible]er in the act of phonation: this was due to a [illegible] condition of the left false cord obviously inter-

fering with the free adduction of the left true cord. The motions of the right cord were quite normal. The voice again returned, and the cords were seen to act symmetrically on the application of a solution of iodine in olive oil to the larynx.

Two cases of 'double voice' are described by Sir Duncan Gibb in his book 'On Diseases of the Throat,' in which the affection was due to a cause in some degree similar to that which had produced the falsetto voice in the above instance.

These observations appear to show that laryngeal falsetto sounds are really due to the vibrations of the vocal cords being confined to the edges of the cords, inasmuch as it will be readily understood that when a portion of these organs only are exposed to the vibrating power of a current of air, the vibrations must have a tendency to be distributed in the direction of their length rather than in that of their breadth; hence the vibrating power of the blast was, in the above case, exclusively concerned in bringing about the vibrations of the rims of the cords thoughout their whole length, but when the entire cords were exposed to the action of the current of air, the vibrations were, as might be expected, distributed in the direction of the breadth of the cords, and caused a chest-note.

The Tyrolese and Swiss singers acquire the power of singing clear falsetto notes at will, and of passing abruptly from a chest-note to a head-note, giving rise to the so-called 'Yodle' singing. I have, for some time, observed that this kind of phonation is carried on without any or with but a trifling motion and approximation of the cricoid and thyroid cartilages. It is well known that the cricoid cartilage is raised and approaches the thyroid when the notes of the scale are sung with the

chest-voice, beginning with the lowest; and this can be observed by anybody on applying a finger to the throat between these cartilages, and then singing different chest-notes. The motion of the above cartilages being due to the contraction of the crico-thyroid muscles in the act of stretching the cords, it appears to me that the tension of these vocal organs is actually not altered in 'Yodle' singing. What can be, therefore, the action of the larynx for the production of falsetto sounds? In order to solve the present question, I requested one of the well-known Tyrolese singers, when recently giving concerts at St. James's Hall, and singing the 'Yodle' in perfection, to be so kind as to submit to a laryngeal examination, and this gentleman most obligingly acceded to my request. I had some difficulty in obtaining as good a view of his larynx as I should have liked, from the irritability of the pharynx, but I saw his vocal cords distinctly. They were beautifully developed, and the motions of the laryngeal muscles were full and rapid. While he was in the act of singing head-notes the cords were seen to be considerably shortened, and their edges tightly applied against each other.

The shortening of the vocal cords of the Tyrolese Singers for the utterance of falsetto notes was obviously due to the action of the arytenoid cartilages, which may be considered in some respects as actually forming part of the cords; these, by being made to press against each other, would diminish considerably the length of the cords, producing the same conditions as when an 'harmonic' note is brought out on a violin or violoncello, by pressing the finger lightly on the cord at certain places. The clear head falsetto note appears to me an harmonic, due to the shortening of the

vocal cords, without any increase of their tension. The skill of the singer consists in his being able to shorten his vocal cords precisely to the extent required so as to strike abruptly one of the harmonics; if he has to search for it, his voice will be screeching and painful to hear, just as when a beginner on the violoncello tries to find out the harmonics on which a skilled performer will alight at once. Thus, falsetto singing must be due to the action of the arytænoideus muscle, which contracting more powerfully than usual, brings the arytenoid cartilages into mutual contact.*

PATHOLOGICAL CONCLUSIONS.

From the above considerations it follows that speaking in the falsetto voice may result from some abnormal contraction of the arytænoideus muscle, as practised by Tyrolese singers. It can also be owing to a state of weakness or paralysis of this same muscle, to spasmodic contractions of the abductors or posterior crico-arytenoid muscles; or to a swelling of the arytenoid cartilages—these circumstances preventing the mutual posterior approximation of the cords to such a degree as would be required for the act of phonation, the anterior portions of the cords meeting, however, close enough to vibrate. A cracked voice may, again, be due to swelling of one of the false cords, interfering with the motion of the corresponding true cord; and I have also seen this alteration of the voice

* For further information on this interesting subject, I must refer the reader to Prof. Müller's work on Physiology: when experimenting on the human larynx *withdrawn from the human body*, he has observed the falsetto voice to depend either on a high degree of tension of the vocal cords, or on a feeble rush of air from the chest with but a very low degree of tension of the cords.

depend on a mere swollen condition of the true cords, preventing the vibrations from being fairly distributed across their breadth.

The cause of aphonia, and of a cracked or falsetto voice, may usually be readily seen with the Laryngoscope. I say *usually*, because it is not always so, inasmuch as in certain cases of weakness of the muscles of the cords the whole of the laryngeal opening contracts in the act of phonation, the true cords, if they exist, being concealed from view; also when the epiglottis is pendant or when the arytenoid cartilages and epiglottidean folds are much swollen, the cords may be invisible.

Should a cracked voice be due to weakness of the arytænoideus muscle, galvanism will probably be the best means of restoring its normal properties; but should it be owing to swelling of the arytenoid cartilages, or of other parts of the larynx, the topical use of astringents, or, as I have observed, the application to the larynx of a solution of iodine in olive oil, will be the best treatment to adopt.

DIVISION OF THE SUBJECT.

The present Essay is divided into three parts. The first includes a few remarks on the instruments to be used in the practice of Laryngoscopy, and on their application; to which is added a short notice of simple Laryngitis.

The second part treats of hysterical and nervous Aphonia.

In the third part I have described the condition of

the larynx, as seen with the Laryngoscope, in laryngeal Phthisis, and reported the treatment I have adopted in such cases.

No attempt has been made at completeness: indeed my sole objects are to add the result of my experience to that of other physicians in this country and elsewhere, who have devoted their attention to the pathology and treatment of laryngeal disease, and to show the inestimable value of the Laryngoscope.

The drawings have been made by Mr. Lens Aldous, under my immediate directions, a preparation of the tongue and larynx, preserved in spirits, being used as a groundwork. It took a number of meetings for every drawing, fresh corrections being made at every successive sitting, until the drawing was as near as possible like the original, seen in the mirror. I have thought it advisable to give two lithographs of the human larynx withdrawn from the body after death, that they might be compared and contrasted with the drawings of the larynx as seen with the Laryngoscope during life.

PART I.

LARYNGEAL INSTRUMENTS AND THEIR USE.

SHOULD any of my readers, unacquainted with the use of the Laryngoscope, feel inclined to try it, a few hints as to the instruments required for the examination and treatment of laryngeal affections may be acceptable.

If the rays of the sun are not available, the light had better be a gas-lamp, with an Argand burner, and a bull's-eye lens as a light-condenser; this can be moved up and down on a stem fixed to a heavy stand in the same way as a common reading-lamp, or connected with one of Mackenzie's articulated brackets (rack-movement) — a most effectual kind of stand, although requiring to be fixed to the wall, and on that account unavailable in many cases.* Where gas is not supplied, a good moderator-lamp answers the purpose, a powerful bull's-eye condensor being fixed (when required for use) to the brass holder of the lamp-glass by means of a spring clamp—a very clever, effective, and portable instrument, suggested and first employed by Dr. George Johnson, and which I use when called

* While these pages were going through the press, I became acquainted with an Argand burner so constructed as to admit oxygen gas into the coal-gas flame, and this gives a beautifully white clear light, much brighter than gas, which will be of great advantage to Laryngoscopy. I am now using it for that purpose instead of the common gas-light.

upon to examine patients at their own residence. The principal disadvantage of a moderator-lamp, under this circumstance, is the difficulty of giving it the proper height, which is one of the most important conditions for the successful investigation of the larynx. I have used books for that purpose; but this kind of stand is neither straight nor steady, and the slightest touch of the arm is enough to upset the lamp on the table.

I should recommend the following instruments to be procured together, instead of purchasing them as they may be required; the operator will thus be prepared for any affection of the larynx he is likely to meet with.

1st. A Laryngoscope case, with four round mirrors, two of them seven-eighths, another six-eighths, and a fourth five-eighths of an inch in diameter—(I mostly use one seven-eighths of an inch in diameter); also containing two handles for the stems of the mirrors, a narrow German-silver blade, curved at the end, for raising the velum palati when the nasal fossæ are to be inspected; and a reflector to be worn on the forehead. Some reflectors have a perforation in the centre, through which the observer is to look; these I find to illuminate the larynx better than the others, but they are more trying to the eyesight.

2nd. A wide spatula to depress the tongue. I am in the habit of using a straight one, and think it preferable to one bent at right angle; but opinions may vary on this point.

3rd. A set of camel-hair brushes and a long handle, bent to the proper angle, to which they may be screwed.

4th. One of Mackenzie's laryngeal tube-forceps, to be used for the removal of tumours, and of foreign bodies from the larynx. I think this is more convenient, and easier in its application than Mackenzie's

ordinary laryngeal forceps, although there may be cases requiring the latter.*

5th. One of Mackenzie's laryngeal scarifiers, in which the lancet is protected by a sheath, out of which it is made to project by pressing on a lever. The lancet should be particularly sharp as the parts to be scarified are often extremely soft, and likely to yield rather than be cut into under the pressure of the instrument.

6th. A small galvanic battery, supplying an interrupted induced current. I am in the habit of using one of Smee's, from Messrs. Horne and Thornthwaite. It is small and portable. Also, one of Mackenzie's laryngeal galvanisers, with a small sponge safely secured to it, and a neck-band for the external electrode.

7th. One or more india-rubber bags, about ten inches long and two broad, supplied with strings at each end, in which ice and salt are to be applied to the throat when required, to produce a certain degree of anæsthesia, and thereby prevent the involuntary contractions of the pharynx.

8th. One of Gibb's laryngeal syringes.

9th. *Solutions:* Of nitrate of silver, two and three scruples to the ounce of water or glycerine; of perchloride of iron, ʒij to ℥i (Mackenzie); of iodine, gr. xx, and iodide of potassium, gr. v, in olive oil ℥i. These fluids to be applied to the larynx with the brush only.

It will also be advisable to have at hand one of Clark's hand-ball spray-producers, and ether, chloroform, and ammonia, in separate bottles, to be used in case laryngeal spasms be induced by the application of galvanism or caustic solutions to the larynx.

* Dr. G. Johnson uses, for the removal of morbid growths from the larynx, an "écraseur" or wire-snare, made for him by Messrs. Weiss; it is a modification of one employed successfully in several cases by Sir Duncan Gibb.

I believe these instruments can be procured at most of the leading surgical instrument makers.

A few words as to the best process for obtaining a good view of the larynx will suffice. The patient should be seated in a high chair,* say twenty-five inches from the floor, in the absence of a high chair the patient's body can be raised with books. The light is placed behind the patient, on his right side, and on the level with his mouth. The observer sits on a music stool facing the patient, with the forehead at the same height as the light, and the patient is requested to protrude his or her tongue and hold it with a handkerchief. The physician must then, without moving his head, turn the bull's-eye in such a position as will throw the whole of the light on the forehead-reflector, and reflect it into the patient's mouth. The laryngeal mirror is then warmed, and its temperature ascertained by pressing it against the cheek, or the back of the hand, and it is introduced into the patient's mouth, care being taken to keep the hand perfectly steady, and not to bring the instrument in contact with the tongue, but only press it gently and steadily against the velum palati. The use of a spatula can be tried, if necessary, to depress the tongue, although it is often not readily borne in a first examination, and, if contractions of the pharyngeal muscles be induced, it is better to have recourse at once to ice, or the ice-bag, or to the injection into the throat, with a laryngeal syringe, of a solution of five grains of chlorate of potash and five grains of alum per ounce of water, or to the inhalation of a few whiffs of chloroform. By changing the position of the plane of the mirror, every part of the larynx may be brought

* I use a common chair raised on a square wooden stand seven inches high.

into view, except when a pendulous condition of the epiglottis occludes the opening of the larynx. It must be recollected, and constantly kept in view, that the epiglottis is the anterior part, and the arytenoid cartilages the posterior part of the larynx.

The introduction of the brush, or of the galvanizer, into the larynx requires some little practice, but is not difficult. If the operator tries to guide the brush by following its movement slowly in the mirror, he will, I believe, often fail by allowing time for the muscles to contract, causing a displacement of the larynx. I am now in the habit of introducing the brush rapidly, using the mirror rather with the object of ascertaining that the instrument has reached the proper place, than as a guide for its introduction.

If operations are to be performed on the larynx, should the patient have any difficulty in bearing the introduction of the mirror, it is necessary to begin by causing a thorough condition of anæsthesia of the larynx and pharynx by any of the methods stated above. I think it a very good plan to practise, at one's leisure, the removal, with the Laryngoscope and forceps, of such bodies as pins and needles, run into the inside of a paper tube, at different depths, and held vertically.

The application of galvanism to the cords is easily effected by means of Mackenzie's ingenious galvaniser. I do not pass the current longer than from one to three or four seconds at a time, and introduce it from one to four or five times at a sitting. I am in the habit of judging of its strength by trying it with the hands, and ascertaining that I can bear it without discomfort; but it is remarkable what a strong current the larynx will bear for a moment. Except in one case, I have never seen the application of galvanism to be

attended with serious spasms of the glottis; in that instance the unpleasant symptom passed away rapidly on giving my patient ether and ammonia to smell, chloroform would probably have been as effectual.

LARYNGITIS, OR INFLAMMATION OF THE LARYNX, UNATTENDED WITH TUBERCULAR SYMPTOMS.

This includes simple irritation and relaxation of the laryngeal mucous membrane, and chronic inflammation with thickening of the part, both affections are very frequent causes either of hoarseness, or of a weakened condition of the voice, or of complete aphonia. As stated in my Introduction, I have availed myself of the many opportunities of examining the throats of patients applying to the Consumption Hospital, and I have to thank many of my colleagues for having kindly brought under my notice interesting cases of laryngeal disease which have occurred in their hospital practice. A considerable number of cases which have fallen under my observation are instances of laryngeal phthisis; but some exhibited no signs of tubercles in the lungs or elsewhere, and were genuine instances of laryngitis, or inflammation of the larynx. It is not my object to report a selection of cases treated successfully, but I propose relating a few which have appeared to me calculated to exhibit the characteristic features of some of the forms of laryngeal inflammation.

It is very obvious that those whose profession make it a necessity that they should exert, to a considerable extent, their vocal powers, are most liable to hoarseness, a cracked voice, or complete loss of voice from laryngeal inflammation. These may be assumed to be statesmen and gentlemen engaged in addressing political and social meetings, barristers, naval officers, clergy-

men, professors and lecturers, professional singers, amateur singers, auctioneers.

I should call open-air preaching the most likely to affect the voice, because the cold air, acting for a considerable length of time on the congested larynx, may be expected to give rise very readily to a state of inflammation of that organ. Naval officers are frequently subject to hoarseness and loss of voice. Professional singers being called upon to go home late at night in the cold weather, after three or four hours of uninterrupted singing, are, I believe, very subject to some degree of hoarseness. I presume, however, that they are usually in the habit of guarding against this particularly inconvenient affection, by wrapping up and wearing comforters in winter before their mouth, and in short, adopting every precaution against the admittance of cold air into their throat.

The larynx, in cases of simple irritation, exhibits, when examined with the Laryngoscope, a deeper pink or red colour than usual, and perhaps a slightly relaxed condition of the mucous membrane; the irritation may be an extension of common sore-throat, additional mischief being frequently seen in the deeper part of the pharynx and on the back of the tongue in the vicinity of the epiglottis, where streaks of enlarged capillaries, together with swollen papillæ, can often be detected. In the mildest cases, a difficulty in the act of singing may alone be perceived, together with a peculiar harshness of certain notes; there is also a feeling as if some small foreign body, as a particle of sand or a wheat-husk, were adhering deep in the throat. Ineffectual efforts are made to expel the imaginary object, which add to the discomfort, and the affection lasting for a considerable time, in spite of gargles or

medicines, nothing is left to the sufferer but to have recourse to the Laryngoscope. It sometimes happens, in these cases, when the arytenoid cartilages, or the false vocal cords have become slightly swollen, that the voice becomes altered, and acquires the falsetto or cracked sound. This is a frequent and unpleasant defect of the voice, which is quite amenable to treatment, even if it has lasted for a considerable period.

A state of congestion of the mucous membrane, of the arytenoid cartilages, epiglottidean folds, and false cords, may extend to the true cords, which then lose their pale lustre, and assume very much the same red colour as the mucous membrane of the false cords. Under these circumstances they appear to lose their elasticity, but whatever be the cause of this condition of the true cords, they no longer vibrate freely, and the tone of the voice assumes either a low, harsh sound, with a deficient intonation in the act of speaking, or occasionally the cracked sound.

Simple temporary hoarseness and loss of voice may pass into the chronic form, and then become more difficult to treat successfully. These cases are very easily diagnosed with the Laryngoscope, when the mucous membrane of the arytenoid cartilages, epiglottidean folds and false cords is seen to be thickened and relaxed; the aspect of the part is not the tense, glistening, and circumscribed appearance of a laryngeal abscess, but a universal and irregular hypertrophy, leaving a contracted triangular opening for the passage of air. The cords are not seen, or appear quite rudimentary, either from their having lost, in a great measure, their lustre, or from the swollen larynx acting as a screen. On attempting phonation, the whole larynx closes, and no sound, or but a harsh low note, can be emitted.

Œdema of the glottis, or supra-glottic œdema, is not unfrequently met with, and may be attended with serious results from its obstruction to the laryngeal passage. In these cases, on looking under the epiglottis in the laryngeal mirror, sometimes nothing is seen but a large round body, closing the laryngeal opening; or this mass may be observed to consist of two semi-circular swellings, pressing against each other, a small opening being left anteriorly at the base of the epiglottis, which is the only means allowing of the admission of air into the lungs. There is much pain in swallowing, considerable dyspnœa, and the submaxillary lymphatic glands are enlarged and painful; the voice is very weak, and may be lost.

Abscesses of the larynx are not, I believe, of frequent occurrence; they can be diagnosed without difficulty, from the circumscribed shining and tense appearance of their mucous membrane. In a case of great interest, which will be fully related, there was aphonia, much pain in the throat, with difficulty in breathing, and dysphagia. As previously stated, some trouble may be found in the incision of these abscesses from their being so soft that they yield to the pressure exerted on the scarifier, let it be ever so sharp, instead of being incised. They may open spontaneously, when blocd and pus are expectorated, which is attended with an immediate feeling of very great relief.

The few following cases suffice to illustrate the features of laryngitis, and the treatment I adopted. I have divided them into two classes: the first including illustrations of mere irritation and relaxation of the laryngeal mucous membrane; the second, instances of chronic inflammation, with thickening of the larynx, and one of laryngeal abscess.

CASES OF SIMPLE IRRITATION AND RELAXATION OF THE LARYNGEAL MUCOUS MEMBRANE.

The Rev. Mr. D——, a Baptist minister, called upon me, complaining that some years previously he had suffered from partial loss of voice. He had recovered, at Malvern, under the cold-water treatment; but his voice had not regained its strength, and he was occasionally hoarse. On percussion and auscultation the lungs were found healthy. With the Laryngoscope I distinctly saw the mucous membrane of the larynx above the true cords, in a relaxed state. On the right side of the larynx there was a slight thickening of the membrane, with an uneven surface. On placing my finger to the neck at a spot corresponding to that of the internal thickening, he said he occasionally felt a slight pain in the throat at that very place.

I prescribed a solution of alum, of ʒj in six ounces of water, to be showered into the larynx with the hand-ball spray-producer, and a mixture, containing chlorate of potash, to be taken internally; at the same time, I strongly urged upon him the necessity of abstaining from preaching for two or three months. This gentleman was leaving for his residence in Wales, and I have not heard from him since.

The second case is that of a lady—a governess—who consulted me for a cough. During our conversation, I noticed a peculiar hoarse and cracked tone of her voice, and, in answer to my questions, she said she had been troubled with this for a very long while, as she could not recollect being free from it, and was put to great inconvenience, from the unpleasant sound of her voice, when speaking, and especially from her

being prevented from singing; she also complained of a husky feeling in the throat. The examination of the larynx showed its mucous membrane to be red and relaxed, and the vocal cords were apparently congested. On my proposing to apply a solution of nitrate of silver to her throat, she expressed great doubts as to the use of any treatment for the improvement of her voice, as the hoarseness had lasted for so long. I applied, however, the caustic solution to her larynx, and prescribed an alum gargle, with a simple cough mixture. A week after, she called on me her voice having decidedly improved. I again repeated the operation on two occasions within the following fortnight, and she then left for the country with a clearer, and certainly improved tone of voice.

I need only relate one more instance of this kind—that of a lady very fond of singing, and who, for several months, had been suffering from a considerable degree of discomfort in the throat, as if a wheat-husk was adhering to it, which could not be dislodged. She was continually trying to clear her throat by coughing and hemming, but felt she was becoming worse. She could not modulate her voice as before, or sing the notes in so clear a tone, although there was no hoarseness. Having requested me to examine her throat with the Laryngoscope, I found the cause of the mischief to be owing merely to a few swollen papillæ at the back of the tongue, with some slight redness of the larynx. I then advised her to syringe her throat with a solution of alum in water, using Gibb's laryngeal syringe. This she did regularly several times a day, for some weeks, and finally recovered completely. An attack of bronchitis caused the treatment to be discontinued, but it was afterwards resumed.

CASES OF CHRONIC INFLAMMATION, WITH THICKENING OF THE LARYNX.

These cases, when attended with much swelling, mend but slowly under treatment, but, from my experience, with patience and perseverance, the voice may be recovered to some extent, although I question whether a sufficient degree of freedom is acquired in the movements of the cords to allow of the perfect intonation of the voice in the act of speaking; and the sound of the voice remains harsh.

I believe that the complete disappearance of the true vocal cords must not be considered as an indication that the voice cannot be recovered. In a very remarkable case of tubercular laryngitis I have had under my care, the voice was recovered, notwithstanding that the closest examination of the larynx, and the patient exhibited his throat admirably, failed to show the presence of the vocal cords. In this case the voice was entirely due to the action of the false cords, which had accommodated themselves to the patient's requirements, and become possessed of the power of vibrating, emitting a harsh and low, but not unpleasant sound, which could be well heard at a distance.

The main condition for success in the treatment of these cases is never to give way to discouragement. The practitioner who makes up his mind to grapple with diseases of the larynx must have in stock a large amount of patience, or he will soon be tempted to give up in despair the use of the Laryngoscope and the treatment of throat affections. He must remember that cases of chronic inflammation of the larynx may go on lingering for weeks without any apparent benefit from the treatment, and yet they should not be given

up as incurable, as the voice may break forth some day. Every little improvement should be noted; even the fact of the whisper becoming louder may foretell the return of the voice. Patients are sometimes conscious of an increase of power of the muscles of the vocal cords previous to there being apparently any marked improvement in the voice; and they may be conscious of a weakness in the power of uttering sounds before there exists any very apparent loss of voice, this being perhaps more frequently observed in cases of consumption.

Case.—Edward W——, a lighterman, an out-patient of the Hospital for Consumption, Brompton, came under my care on the 18th June, 1868. Has been very hoarse for more than twelve months, and occasionally experiences much difficulty in breathing, from an obstacle in the throat to the passage of air; has a pain in the larynx, increased by swallowing, and at times deglutition difficult. The physical signs give no evidence of tubercles, although some hereditary predisposition to phthisis exists, and he spat blood eight months before. They are found to be as follows:—Left side, in front, respiratory murmur deficient, with exaggerated expiration, no crepitation, no dulness on percussion. Right side, in front, respiratory murmur louder than on the left, with rather bronchial expiration, no dulness on percussion. Temperature in the mouth, 98° 5′. His father died of phthisis. With the Laryngoscope the mucous membrane of the arytenoid cartilages and epiglottidean folds is seen to be highly swollen, in addition to which the epiglottis falling in front of the larynx to some little extent, prevents effectually any laryngeal opening from being visible. I applied a solution of nitrate of silver to his larynx, and directed him to inject into his throat, twice a day, a solution of sulphate of zinc, by

means of Clark's spray-producer, and to paint the throat with tincture of iodine. At the second examination with the Laryngoscope, two days later, the obstruction was seen to resolve itself into two distinct round masses in contact with each other. The throat was less painful, and he could swallow easier. A leech to be applied on each side of the larynx. On the 22nd I punctured twice the swelling on the right side of the larynx, with Mackenzie's scarifier, and blood came trickling slowly from the puncture. The next day a considerable degree of relief had been effected, and the orifice of the larynx could be seen on the right side. On the 26th I again punctured the larynx, and as very little blood was drawn, two leeches were ordered to be applied to each side of the larynx, also a solution of alum ʒss, and chlorate of potash, gr. xx in water ℥iv, to be applied to the throat with a laryngeal syringe. The application of leeches was repeated on the 29th—four on each side the throat. On the 11th July I again scarified the larynx, and obtained rather more blood than before; directed to inhale the vapour of iodine, and rub his throat with strong mercurial ointment once a day.

The swellings in the larynx were soon reduced in size, and the voice becoming clearer, although still very hoarse and deficient. Believing the hoarseness and weakness of the voice to result from want of power in the tensor muscles of the cords, on the 17th of July I applied galvanism three times to the vocal cords, and obtained at once a very satisfactory result, as my patient was enabled to speak in a louder tone, and with a tolerably clear voice. Application of galvanism repeated on the 20th July, and nitrate of silver in solution applied freely on the 27th; on the 31st, voice slowly, but gradually, improving. To take

syrup of iodide of iron ʒi, three times a day; and a solution of nitrate of silver, ℈ij to the ounce, is again applied to his larynx with a brush. On the 5th August, lungs examined, and a spot detected at the base of the chest, which is decidedly dull, and slightly painful on percussion, where the respiratory murmur is deficient and harsh. The patient tells me he fell on the side of a barge about two years and a half previously, hurting his chest at that very spot. There is probably some thickening of the pleura there, and some slight local pulmonary congestion. I lost sight of this patient from the 5th August till the 19th October, when his voice was rather weaker, and hoarseness had somewhat increased. He informed me he had been engaged setting up telegraph posts and wires, and had been obliged to call out frequently, and very loud, while thus employed; he thinks he is the worse for this vocal exertion. With the Laryngoscope the state of the larynx was ascertained to be much the same as when last examined, the opening of the larynx being distinctly seen, though much contracted by the thickening of its mucous membrane; the epiglottis was healthy. The treatment was now resumed as formerly, with the use of galvanism to the cords, frictions on the throat with mercurial ointment, and the application to the larynx of a spray consisting of a solution of chlorate of potash, alum, and iodide of potassium. On the 12th November the voice had again improved, and was tolerably good.

Case.—George L——, aged 28, a potman, called on me as an out-patient of the Consumption Hospital. Has a cough, and has been hoarse for two months, often speaking in a whisper, which he considers to have been brought on by bathing in cold swimming-baths. The

affection, at first, went on increasing for a fortnight, and then remained stationary. No pain in the throat, and none occasioned by swallowing. With the Laryngoscope a condition of œdema is detected on both sides of the super-glottic region; the mucous membrane is seen to be red and glistening. On telling him to call out the word *Ah!* I observe that he cannot bring the vocal cords together, obviously from want of power of the adductors. The state of the chest was as follows: Right base, shade of dulness, and no respiration to be heard there; left base, no distinct dulness, but respiration very deficient and harsh. Some dyspnœa on quick walking, or going up stairs. Never had any attack of inflammation on the lungs; no emaciation; never suffered from hæmoptisis, and no hereditary predisposition to phthisis; never had syphilis. This appears to me too doubtful a case of tubercles to allow of its being considered as such.

July 29th; I galvanised this man's vocal cords, but with little expectation of success; as proved to be the case. The application of a solution of nitrate of silver (ʒij to the ounce) to the larynx was followed by an improved condition of the voice. To take cod-liver oil and a cough mixture. On the 31st, voice better, but still very hoarse; considers himself improving. A blister to be applied to the throat. I next saw him on August the 5th; he had by that time applied two blisters to the throat and felt much better, voice much improved, though still hoarse. I examined his larynx, and found the mucous membrane, on the right side, still swollen and red, but that of the left arytenoid cartilage and false cord was much less swollen than before. He is getting stronger, and walked here to-day from Brompton, a distance of about three miles.

In the following case of abscess of the larynx, Mr. Hillman, of the Westminster Hospital, performed successfully the operation of tracheotomy. The case was reported in the *Lancet* (11th November, 1868), and published under our conjoint names; having occurred under my care and that of Mr. Hillman's consecutively, the medical and surgical reports have been supplied by each respectively.

Case.—Harriet C., aged 20, first called on me (William Marcet) on the 7th February of the present year (1868). Has been suffering from hoarseness and loss of voice for the last four months, and now speaks in a whisper, which she considers due to sleeping in a damp bed; slight pain in the throat on the left side, on swallowing, and feels as if there was something swollen there, interfering with the act of breathing. I obtained a good view of the larynx with the Laryngoscope. The mucous membrane over the left arytenoid cartilage was very much swollen, occupying one-third of the breadth of the laryngeal opening; the swelling had the circumscribed and glistening appearance of an abscess. On the right side of the larynx the mucous membrane was red, the vocal cords had not their pale normal appearance; they were drawn towards each other, not moving at all freely in the act of respiration. I prescribed for her a mixture to take, containing iodide of potassium; a solution of sulphate of iron to be injected into the larynx with Gibb's laryngeal syringe, and tincture of iodine to be applied every other day to the throat. Six days later she suddenly felt as if something gave way in the throat, and on coughing brought up a mixture of matter and blood. The next day her voice returned, although weak; it gradually improved, and on the 28th February

was tolerably strong. I examined her larynx on that day; there was no swelling to be seen; the mucous membrane of the right epiglottidean fold and false cord was red and relaxed; no ulceration. I again saw the patient on the 5th June. Up to the previous fortnight, or for about three months, her breathing had been quite free and voice good, but with slight hoarseness; since then, however, respiration had again become difficult. She complained to me of pains in the throat, and air could be heard rushing through the contracted larynx.

A laryngoscopic examination showed the left vocal cord to be partly out of sight, apparently on account of its congested condition; the right cord was healthy, the mucous membrane over both arytenoid cartilages was much swollen, and a deep sulcus was visible between them; the vocal cords receded from each other imperfectly. I applied a solution of nitrate of silver to the larynx, and prescribed one of sulphate of zinc to be injected into the larynx with the laryngeal syringe. On auscultation of the chest, all over the left side in front mucous rales were heard. On the right side, at apex, prolonged and bronchial expiration, shade of dulness and pain under that spot on percussion, some mucous rales lower down.

On the 8th June the laryngeal tumour having increased in size, and being obviously an abscess, I made a first, though ineffectual, attempt to incise it with Mackenzie's laryngeal scarifier. I again tried on the next day to open the abscess, but the swelling was so soft that it constantly receded instead of being cut into, as I pressed the scarifier upon it. I succeeded, however, in my object, as shortly after the patient left me she expectorated a large quantity of matter, and was

power, and that [illegible]
[illegible]ded to for [illegible]
now suffers [illegible] from
occasional [illegible]
[illegible]on immediate suffocation. [illegible]
apprehensive anxiety of [illegible]
[illegible]rgeons in cases of [illegible]
[illegible]hing, other functions remaining
[illegible]peak only in a low whisper.
[illegible]ccompanied with [illegible]
but not such as denotes [illegible]
[illegible]-passages.

In January and February of [illegible]
[illegible]ce and general health were good, and [illegible]
[illegible], but the left epiglottidean fold was [illegible]
[illegible] normal, and right supra-glottic region [illegible]

thereby greatly relieved. On the 18th June, or nine days later, she felt no pain or swelling in the larynx, but the breathing was not quite so free as before. Six days afterwards her voice was much improved, and was, indeed, tolerably good, but she complained of the difficulty she experienced in the act of breathing. I have no record of the condition of the vocal cords on that day, but the difficulty of breathing gradually increased, and on the 20th July I observed her vocal cords to be in close approximation, leaving just room enough between them for air to pass; they remained fixed in that position and firmly stretched. The power of the abductor muscles appeared all but lost, while that of the laxors could still be exerted to some extent, as she could speak in a fair voice; there was no inflammation in the larynx to account for this state of the cords. I tried all kinds of treatment, but nothing except the application of galvanism to the cords appeared to give her any relief; at the same time her general health began to fail, and she lost flesh rapidly. The temperature of her body on the 27th July was 99° 5′ F., under the tongue. On the 28th she complained of bringing up her food, and of pain in the stomach; tongue red. Up to that day I frequently examined the larynx, and could see no improvement, indeed, the space between the cords, available for respiration, was becoming less and less, and her features were expressive of the most painful state of apnœa. I then recommended her to apply to the Westminster Hospital, feeling assured that no other means but tracheotomy could save her life.

The operation was performed by Mr. Hillman on August 5th. About the middle of October I examined H. C.'s larynx, with Mr. Hillman. The left cord is

now somewhat atrophied, or less developed, than the right, but exhibits its healthy lustre. With that exception the larynx is quite sound, and the cords are seen moving quite freely in the act of respiration. Her breathing is as easy and free as could be wished. Health is now good, appetite excellent, and she has regained flesh and a ruddy colour of the face. No sign of the operation is left but a very slight scar.*

SURGICAL TREATMENT.—*From Mr. Hillman's Notes.*—"Miss Harriet C. having been so advised by Dr. Marcet, presented herself on 1st August, 1868, for admission into the Westminster Hospital, under my (W. A. Hillman's) care.

"The gravity of the case was at once apparent, and she was kept in a state of perfect quietude, in as uniform a temperature as possible, and carefully watched for a couple of days, when it was evident that Medicine had done all in its power, and that the sister art of Surgery must be appealed to for its special aid.

"Present state :—She now suffers continually from severe dyspnœa, whilst occasional exacerbations of breathing-difficulty threaten immediate suffocation. She presents that marked apprehensive anxiety of countenance familiar to surgeons in cases of physical obstruction to the breathing, other functions remaining as in health, and can speak only in a low whisper.

"The breathing is accompanied with noisy inspiration and expiration, but not such as denotes croupy obstruction of the air-passages.

* I again saw Miss C. in January and February of the present year (1869), her voice and general health were good, and her breathing was quite free, but the left epiglottidean fold was swollen. Action of the vocal cords normal, and right supra-glottic region quite healthy.

"There is but slight expansion of the chest in inspiration, which is effected only by great effort of all the inspiratory muscles, primary and secondary—the slight expansion that occurs being uniform on the two sides. There are no abnormal bronchial sounds, no crepitation, no undue dulness of the chest, and no expectoration of blood or pus. There is no disease visible on examination of the mouth, fauces, or pharynx.

"The laryngeal mirror showed the epiglottis to be sound; both of the upper or false vocal cords somewhat thickened (probably the seat of the previous abscesses), the lower or true vocal cords not apparently changed in structure, but remaining parallel one with the other, probably from paralysis of the abductor muscles by which they should in health be separated laterally one from the other in inspiration, and so all but closing the immediate entrance to the lower division of the cavity of the larynx.

"There are no traces of ulceration of the epiglottis or of the larynx.

"Her present state of danger and distress thus appears to be due, firstly, to the permanently almost closed condition of the chink of the glottis, produced by the approximation of the true vocal cords; secondly, to the thickening of the upper or false vocal cords, produced by the inflammatory effusion (these two causes serving to account for the permanently distressful breathing); thirdly, to the occasional occurrence of spasmodic contraction of the laryngeal muscles, accounting for the greatly increased oppression of breathing experienced from time to time. The indications for surgical relief, therefore, seemed plain, namely, to make and maintain an artificial opening into the air-passages, so that the air might be ena-

bled to pass into and out of the lungs below the several causes of obstruction, and without previously passing through the larynx, and this for two purposes; firstly, with a view to the immediate preservation of life by getting rid of the threatening condition of matters, by which the air-passages might at any time be completely and fatally closed; secondly, with a view to the patient's ultimate recovery by placing the diseased and disordered parts for a time—longer or shorter as might prove necessary—in a state of rest, with the hope that they would thus be restored to a condition of health.

"Accordingly, on the 4th August, 1868, I performed the operation of tracheotomy (the patient lying in an easy unconstrained position), by carefully dissecting down to and exposing the anterior surface of the tracheæ, which being held steadily, and drawn somewhat upwards by the use of a sharp hook set in a scalpel-handle, the three upper rings were divided from below upwards in the mesial line. The dilating forceps which I commonly employ having been introduced through the wound into the windpipe, so as to make the artificial opening widely patent, the secretions were coughed out, and the tracheotomy tube was without difficulty passed into the tracheæ. The tube used was a double one of silver—an inner and an outer, closely adapted the one to the other, the inner, at its distal or tracheal end, projecting beyond the outer —presenting a circular transverse section, of uniform diameter throughout, well curved, with an oval opening at its greatest convexity, and with the apertures of entrance and exit at right angles one with the other, of as large a diameter as the windpipe would admit, and with a shield in front wide enough to overlap the mar-

gins of the external wound,—a form of tube which answers admirably when once inserted, though its first introduction is somewhat difficult, especially if the surgeon be not provided with the dilating forceps previously mentioned. Less than half an ounce of blood was lost during the operation. Chloroform was not employed, as I was desirous to avoid the occurrence of vomiting, which now and then results from its use, and which would have caused much discomfort in this case. The patient bore the operation with great calmness, and the relief afforded was so immediate and so great, as to cause her to express her comparative comfort in strongly grateful terms. When visited in the evening she was found breathing with ease, the tube admirably allowing the free passage of air to and from the lungs, and causing no irritation or pain.

"The subsequent treatment consisted in the maintenance, so far as possible, of an uniform temperature, keeping the tube always clean and free from all obstruction; the allowance of digestible and nutritious food, as much as she liked, with wine and citrate of iron and quinine as a tonic, and small doses of calomel, as probably likely to facilitate the removal of the thickening of the upper vocal cords.

"On the 10th of August, Miss C. looked much improved in health, with a clear complexion, breathing quite easily at the rate of about twenty times in minute; having a good appetite, and cheerful manner, and speaking without difficulty, by placing her finger over the orifice of the tube. She improved uninterruptedly until the 1st October, when the tube, which she had now worn for about eight weeks, being entirely removed, and the wound completely occluded, her breathing through the natural passages proved so satis-

factory during some hours that the tube was not replaced.

"On the 7th October, 1868, she left the hospital, with all difficulty in respiration removed, and in satisfactory health—a result to which the patient's own tranquil manner and well-ordered conduct much contributed."

*Remarks.**—"There are some features, besides those of diagnosis, in the foregoing case, which appear worthy of notice in a practical or curative point of view.

"Diseases of the larynx and tracheæ constitute a class of cases which are attended with much responsibility on the part of the medical adviser, solicitude on that of the relatives, and no little anxiety and distress to the patient.

"The operation of tracheotomy is, possibly, not so frequently performed as it might advantageously be.

"The determination of the period for the operation, when considered necessary, is often attended with difficulty; the operation seems not uncommonly regarded rather as a last resource, to be employed after various supposed remedies have been tried, and found to fail, and much time has been lost. The result is just what happens so often with the operation for strangulated hernia, the operation fails to save life on account of the fatal procrastination in its employment; it is put off until it is but too evident that death is at hand, and then it is done, perhaps, "to give the patient a chance." And what is the value of such a "chance" when no reasonable grounds of hope remain?

"Tracheotomy, when timely and skilfully performed,

* The present remarks are an abstract of those made in *The Lancet* by Mr. Hillman with reference to the case in question.

in suitable cases, is an important means of cure, a potent agent for good, and is, in Mr. Hillman's opinion, not by any means necessarily attended, *per se*, with the amount of danger sometimes attributed to it.

"In the present case the operation might apparently have been delayed for a day or two, or possibly a week; but even if the patient's life had not been suddenly cut short, she undoubtedly would have had only a prolonged period of distress, and he (Mr. Hillman) cannot doubt, had further delay been permitted, that the result would not have been such as is here recorded.

"The *kind of tube* employed is a matter of the utmost importance. It should be of such a diameter that the patient can breathe through it without any voluntary exertion, being always as large as the windpipe will admit; it should also be long enough to pass some little distance into the windpipe—they are frequently made far too short for the purpose. The oval aperture situated at the greatest convexity of the tube is also very serviceable, as it permits of the passage of air through the natural channels (in so far, at least, as their condition will allow), as well as through the artificial opening, and so enables the patient to have the advantage of all the breathing-air possible.

"Supposing the operation to have been satisfactorily performed, there is no other operation in surgery, perhaps, in the after-treatment of which more assiduous and constant supervision and watching are required from the surgeon and the nurse. The patient should not be left unattended, day or night, until all danger from blocking up the tube has passed.

"There is great tendency for the channel of the tube to become obstructed by mucus of the most tenacious character, and so to produce suffocation. The great

advantage of employing a double tube, with the tracheal end of the inner tube projecting beyond that of the outer tube, depends on the facility with which it may be cleaned.

"The maintenance of a warm temperature in the patient's room is another condition necessary to his well-being; because, whilst the breathing is carried on through the artificial opening, the air enters the lungs at once, without being previously warmed, as it is in normal inspiration by having passed through the mouth, nose, and throat. The inspired air may, in cold weather be somewhat warmed by placing some soft porous woollen covering over the tube, acting much after the manner of a respirator."

The following abstract of a case, communicated to the Clinical Society by the late and lamented Mr. A. Bruce, on November the 27th, 1868, is of much interest, as another illustration of the favourable result to be obtained from tracheotomy in certain instances of inflammation of the larynx. The apnœa, in the present instance, was apparently due to spasm of the glottis, and not to a sufficient degree of swelling in the larynx to oppose a mechanical obstacle to the passage of air into the lungs. I had an opportunity of examining this patient's throat, previous to his being operated upon. Mr. Bruce kindly favoured me with the following notes of his case:—

"Michael Smith, aged 45, cutler; admitted into the Westminster Hospital, September 2nd, 1868. General health fair. Suffered from winter cough, and has had secondary syphilis. Drinks freely of spirits. In August he became much worse, and Dr. S. Thompson under whose care he was, sent him to Dr. Marcet. Examined by Dr. Marcet:—

"Laryngeal mucous membrane swollen, red, and shining; the laryngeal cavity was funnel-shaped; vocal cords sound, but had lost their power of tension in the act of phonation. Spoke either in a whisper, or a low, hoarse, tone of voice. No difficulty in breathing.

"Subsequently he went to Ramsgate, and became much worse; returned to town, and suffered from severe dyspnœa for ten days.

"On admission: voice hoarse, face dusky, general restlessness; these symptoms, accompanied by some delirium, became so severe during the night that Mr. Bruce was summoned. He refused to submit to the operation. On the following morning he had improved, and the operation of tracheotomy was performed. Felt much relieved, and expectorated a large quantity of mucus. Continued to improve. The tube was changed on September 7th, when it was found that he could breathe, without distress, through his larynx. Tube was finally removed on the 12th.

"Suffered from a slight attack of bronchitis for a few days, and was then put upon tonics, and employed sulphate of zinc spray.

"October 14th. Examined by Dr. Marcet, who saw a very small point of ulceration at posterior part. Strong solution of nitrate of silver (40 grs. to ʒ i) was applied.

"He has since quite recovered, and speaks with only a slight huskiness of voice. Feels well. March, 1869."

I have not had many opportunities of seeing cases of acute inflammation of the larynx without a tubercular condition in other respects. I presume, however, that this affection must be comparatively frequent, considering that instances of acute inflammation of the pharynx are very common, and it is but natural to

suppose that both the pharynx and larynx must be affected much in the same way by similar causes.

The following case is that of a young lady, about sixteen years of age, I was requested to see with Dr. Mott, of Walton-on-Thames. She was recovering from scarlatina when her breathing became much laboured, with considerable pain in the throat, deglutition being difficult and also painful. The urgency of the symptoms became such that, being that day on a visit at Walton, I had to send home for my laryngeal instruments without a moment's delay. There was some difficulty in examining the larynx, as the patient was confined to her bed, and the fauces were considerably swollen, although not to such an extent as to account for the symptoms. The aperture of the larynx was seen to be apparently closed by the raised supra-glottic mucous membrane. I injected a solution of alum upon the larynx with Gibb's Laryngeal Syringe, which produced an immediate relief, and I left under the impression that no other treatment but the use of the syringe, with a solution of alum, gradually increased in strength, would be required. I was subsequently informed the lady rapidly recovered.

PART II.

NERVOUS AFFECTIONS OF THE LARYNX.

Nervous affections of the laryngeal muscles are of very frequent occurrence; they may give rise to aphonia, from loss of power over the vocal cords, or induce spasmodic contractions of the cords thereby closing the glottis and threatening life from suffocation. Whooping cough and laryngismus stridulus are illustrations of temporary spasms of the glottis. It may also happen that the throat becomes so irritable from inflammation of the part that the mere act of swallowing brings on a temporary closure of the glottis. Again, I have seen impending suffocation from laryngeal spasms, brought on by going up and down stairs rather quick, in the case of a man whose vocal cords were permanently contracted. Nervous cough is a spasmodic contraction of the glottis, due to some distant irritation, independent of any irritation or inflammation of the lungs and air-passages. Galvanism applied to the larynx gives rise to spasmodic contractions of the laryngeal muscles, occasionally lasting for a few minutes after the galvanic current has ceased to pass. I have seen, in a young gentleman, intense fits of coughing caused merely by gentle pressure on the spine at a spot corresponding to one of the lower cervical vertebræ; his lungs were quite healthy. As a rule, I believe, bromide of potassium, taken internally, breathing a little chloroform, or smelling ether or ammonia, to be

in general the best means of counteracting these laryngeal spasms. When a cough is due to some distant irritation to the nervous system, I have obtained good results from the vapour bath, although the affection is not cured until its cause be removed.

Paralysis, or weakness of the laryngeal muscles, causing loss of voice, very frequently attends hysteria; but it must be borne in mind that hysterical aphonia is not a disease, but a *symptom* of the disease—*hysteria.* In most cases the Laryngoscope will show which are the muscles affected; the adductors or tensors may be at fault, although, usually, and it might be said nearly as a rule, in hysterical aphonia, the adductors only, fail in their action. In these cases the vocal cords are observed to keep apart, instead of meeting in the act of phonation; they appear to stretch fairly, hence it may be concluded that the tensor muscles are not at fault. When the tensor muscles of the cords fail—an affection not uncommonly met with in phthisis—their lateral movement is quite free, but the antero-posterior axis of the glottis is seen to shorten in the act of phonation, while the air from the chest causes the loose cords to move aside from each other in the middle instead of their remaining in close approximation throughout their whole length—an indispensable condition for their being made to vibrate. The effort on the part of the patient to obtain the proper degree of tension of the cords is occasionally productive of a spasmodic closure of the glottis, attended with much discomfort. In cases of paralysis of the tensor muscles of the cords, the voice is either altogether wanting or its sound is screeching, harsh, and uniform. A finger being placed in contact with the crico-thyroid space of the patient's throat will satisfy the medical practi-

tioner that there is little or no motion of the cricoid cartilage during phonation, an evidence of the want of power of the crico-thyroid or tensor muscles. The screeching sound is due to the passage of air through a highly contracted glottis, which may now be compared to a sphincter. On the return of the voice, this sound increases gradually and steadily in loudness, and after a time it is emitted quite naturally without any effort on the part of the patient, and with its proper tone and modulation.

In hysterical aphonia from want of power of the adductor muscles of the cords, the voice returns suddenly on the application of electricity, and quickly reassumes its natural condition; if there be a relapse, the voice may again return perfect, under the influence of the same agent, to be lost, possibly, afresh, afterwards. This establishes, according to my experience, a marked physiological difference between aphonia from paralysis of the adductor and tensor muscles of the vocal cords.

A deficiency of power in the adductor muscles, is more likely to cause complete aphonia, than would a weakness of the tensors; this explains the fact that, in hysteria, we do not usually meet with hoarseness, but either with a weak voice, or complete failure of the voice. Such cases are often treated successfully by the application of galvanism to the cords; this means, however, does not always succeed: first, from the trouble occasionally experienced in the application of the treatment, on account of the nervous disposition of the patient; and next, because of the difficulty of obtaining a permanent cure. It is most discouraging to the practitioner, when, after much pains and perseverance, he is just bringing the larynx into sight,

to have to desist at once, from his patient giving way to fainting, or suddenly throwing back her head, with a request that all further attempts be given up at that sitting, although she will admit she has felt no pain, or, perhaps even, no discomfort from the introduction of the mirror. I need not observe how provoking are the relapses which so frequently attend this treatment.

Galvanism undoubtedly produces wonderful results; but as far as my experience goes, unless the patient be at the time in a fair general state of health, in the majority of instances the voice again fails, after a period varying from a few hours, and less, to two or three days, or longer. In a remarkable and troublesome case under my care, the voice returned regularly after each application of galvanism, and as regularly was lost a few hours afterwards.

Hysterical aphonia may be cured without galvanism, patients thus affected sometimes recovering spontaneously; indeed, one of the characters of this disease is the very circumstance that the voice disappears and returns without any apparent cause. It may also be recovered under medical treatment, independently of the use of galvanism; but galvanism should not be neglected.

In the following cases of hysterical aphonia treated by galvanism the return of the voice was permanent.

In June last, I was requested to examine, with the Laryngoscope, Mary V——, aged 20, an out-patient of the Consumption Hospital. Two years previously she had lost her voice completely for seven months, speaking during that time in a low whisper; the loss of voice had been gradual, and she was suffering at the time from general nervousness, a disposition to faint, and much debility. The voice returned suddenly, without any obvious cause, and she retained it for sixteen

months, although at times it was very weak. Two months before I saw her, she again lost her voice somewhat suddenly; and since that time has been speaking constantly in a very low whisper. With the Laryngoscope, her vocal cords are seen to be congested, having lost their natural pale lustre; there is also a follicular condition of the back of the tongue. Is subject to bolus hystericus. Menses regular, but rather scanty.

Although she was very nervous at the time, I succeeded in galvanising her vocal cords; immediately afterwards, she said a few words in a low, though distinct voice. Galvanism was again applied, whereby the voice was improved. Before she left me, I applied a solution of nitrate of silver to the back of her tongue with a camel-hair brush, and prescribed a solution of twenty grains of sulphate of zinc to one ounce of water, to be showered into her throat with Clarke's Hand-ball Spray Producer. She called upon me on the 26th, when her voice was weak and uncertain, but it again improved after I had galvanised her vocal cords. On the 28th of June there was a temporary relapse of the aphonia for nearly the whole day. On the 16th of July she left for Seaford, her voice being tolerably strong, although failing for a few hours every day.

This patient returned to me in the beginning of the following month of August, having quite lost her voice, and galvanism was again successful in bringing it back, although for the time only.

She spent the autumn at Herne Bay, where her general state of health became greatly improved, but she did not recover her voice. She called on me in December, looking very well. I then galvanised her larynx on several occasions, and succeeded in bringing back her voice, which has showed no disposi-

tion to fail, and I have every reason to hope there has been no relapse.

This case is interesting as showing the importance of attending to the general state of health in hysterical aphonia, before an attempt be made to bring back the voice with galvanism. As previously stated, loss of voice is only a *symptom*, hence, hysterical aphonia cannot be cured so long as the patient suffers from the general nervous disturbance known as hysteria. In the case of my patient, Mary V., if she is again seized with hysteria she is not unlikely to lose her voice afresh; but if she remains in good health, no relapse of the aphonia need be anticipated. Cases of partial recovery from hysteria are met with, there being little more than the aphonia left as an indication of the nervous disturbance; in these instances, galvanism may be successful in bringing back the voice immediately and permanently.

Salome B., aged 23, applied to me, at the Consumption Hospital, in July of the present year (1868), that I might restore her voice, if possible. She had chorea when ten years old, at twelve years of age she first lost her voice, and has been subject to aphonia since then, though never beyond six weeks at a time. On the present occasion has been speaking in a whisper for a month. She is of a very nervous disposition, and occasionally suffers from fainting-fits. On attempts at phonation, the right cord appears unable to reach the median line of the opening of the glottis, while the left is adducted, though not so freely as it ought to be. The mucous membrane of the right side of the larynx is relaxed. I galvanised the larynx three times, but the voice did not return.

A few days later,—July 27th,—this patient again

called, when I was more successful. I applied a stiff galvanic current to the cords four times, after which she felt exhausted and faint. She was then allowed to rest on a sofa for half an hour, when, on going up to her, I found her voice had returned; she could modulate its sounds quite well, and, beyond its being rather weak, it was quite natural. July 29th; voice good, but rather weak. Says it has dropped and returned several times. July 31st; aphonia returned; again applied galvanism, and brought back the voice. August 3rd; has retained her voice, and it has much improved in strength. again galvanized her three times. She lost her voice for ten days in January 1869, but on the 2nd February it had again returned; with that exception there has been no aphonia since the commencement of August, the last accounts I have had from her were on the 6th April when I was told her voice was good.

I have had other cases of hysterical aphonia through weakness of the adductor muscles of the cord, treated successfully by galvanism, but they do not differ materially from the above, and need not be reported.

The following is an illustration of those instances of hysterical aphonia where galvanism fails to effect a permanent cure.

Elizabeth T., aged 32, subject to loss of voice for the previous twelve months, although it occasionally returned, but for no longer than two days at a time. I first saw her with Dr. C. T. Williams, at the Consumption Hospital, in the beginning of March, 1868. The following note of her condition was taken on April the 22nd. Complains of want of power in the act of deglutition, so that she can only swallow soft food and liquids. With the Laryngoscope I observe the papillæ of the back of the tongue to be enlarged and red, the

vocal cords and larynx are quite healthy. On telling her to try to call out the word *ah*, I can distinctly see the vocal cords approaching each other to within about one-eighth of an inch and remaining in that position, so that they cannot be made to vibrate. I examined her chest on the 9th of May, and beyond some harshness on the left side, and bronchial breathing on the right, there was nothing amiss with the lungs. Temperature of mouth under tongue 98° 3.

This case proved very remarkable as showing the action of galvanism in bringing back the voice, which, however, invariably left shortly afterwards. The patient was under my care from the beginning of March till the beginning of June; she was frequently galvanised during that time, and on every one of these occasions, with but one or two exceptions, the voice came back strong and natural, giving me every reason to hope that the cure would be permanent. In order to assist the action of the galvanic battery, I directed her to inject astringent solutions into her larynx with Clarke's Hand-ball Spray Producer; cold douches were applied to her neck; she took iron and bitter medicines, and wore Pulvermacher's galvanic chain, but the treatment, although effectual in restoring the voice for several days in succession, and improving her deglutition, did not succeed in effecting a permanent cure. She last visited me on the 10th of June, when her voice was weak, often subsiding into a whisper. Her larynx was then galvanised twice, and her voice returned quite good. Although she left me in possession of her voice, I can have no hopes that she retained it.

This patient had been obviously suffering from hysteria from a considerable length of time, being subject to loss of voice for the previous twelve months,

and this long-continued state of debility, which the general treatment appeared ineffectual to cure, was the cause of the relapse of the aphonia after perfect recovery of the voice. I fully believe that, in a case of this kind, with time, change of air, and perseverance in a tonic treatment, the voice would be permanently recovered with, and perhaps without, galvanism.

Case of Paralysis of the Tensors of the Vocal Cords cured by Galvanism.

The following is a very interesting case of paralysis of the thyro-cricoid or tensor muscles of the vocal cords, which occurred in the hospital practice of Dr. C. T. Williams, who requested me to examine the patient's larynx. Mrs. B. had always been in delicate health, and suffered from slight hæmoptisis six weeks before, for the first time; her mother, two sisters, and one or two brothers, died of consumption. Phys. signs (on the 24th March): Left side, in front, harsh respiratory murmur, no dulness. Right, very harsh respiratory murmur, and prolonged expiration, slight falling in of the chest at apex, and shade of dulness there. At the back, respiration very harsh in both supra-spinous fossæ, no obvious loss of flesh.

There were no symptoms of hysteria; the patient lost her voice about nineteen months ago. On the 14th January, 1869, I made a laryngoscopical examination of Mrs. B.'s throat. The larynx was observed to be normal, although rather red. Cords quite healthy, but as soon as the patient tries to utter a sound the whole larynx contracts spasmodically, and the glottis closes, instead of the vocal cords being made to vibrate; the diagnosis was plainly weakness, or

paralysis of the tensor muscles of the cords. These spasms, on attempts at phonation, are occasionally distressing; deglutition sometimes difficult, and also attended with spasms of the laryngeal muscles. Now and then acute pain below both clavicles.

This case, although it is perhaps hardly fair to consider it as one of confirmed consumption, certainly exhibits symptoms of a very suspicious nature, and it might have been better to bring it forward with the other illustrations of tubercular disease; the cause of the aphonia, however, in the present instance, was so obviously depending on a state of weakened muscular contractility from loss of nervous power, that I have thought it best to introduce it as one of purely nervous aphonia. It is right, however, to note that this loss of voice was obviously connected with a tubercular tendency.

The treatment was commenced with ten grains of bromide of potassium, taken three times a day, and the application of galvanism externally between a spot just above the sterno-clavicular articulations and thyroid cartilage. On the 18th February, the voice had not materially improved; croton oil liniment was applied to the chest, quinine and cod-liver oil were substituted for the bromide of potassium mixture, and I commenced applying galvanism directly to her vocal cords. Shortly afterwards her voice began to improve. On March the 13th her vocal cords had been galvanised on four or five occasions; her voice was much better, being fair, although not yet strong; no longer any straining or spasms in the act of phonation. She cannot yet modulate her voice from a low to a high note. Slight dyspnœa. The treatment with direct application of galvanism to the cords was continued on the 24th March, and 5th April. On the

8th April her voice was quite natural, and she could sing a few notes fairly. Her speech was perhaps not quite so loud as with most people, but this would not be noticed. The spasms of the larynx have quite ceased, and the patient has much improved in her general state of health. I consider the aphonia as cured. A relapse, however, might take place if the tubercular disease should progress.

The action of galvanism in the present case was not the same as usually occurs with hysterical aphonia, where the voice is brought back at once, although it may afterwards relapse into a whisper. With Mrs. B., the improvement of the voice was very gradual at first, the power in the defective muscles of the cords returning by degrees. From the first direct application of galvanism to the larynx, there was no relapse of the aphonia, and the voice continued steadily improving. No doubt the tonic treatment added to the favourable action of galvanism.

Immovable Condition of the Stretched Vocal Cords.

There is another interesting nervous affection of the muscles of the vocal cords, in which the state of the larynx is as follows. It may be red and irritated to some little extent, but not necessarily so; the true and false cords appear healthy; the true cords are seen to be fixed and immovable, stretched as two fiddle-strings apparently in contact, or nearly so, and leaving a small V-shaped opening at their posterior extremities. The patient has no power of moving the cords away from each other in the act of respiration, and the result is a state of dyspnœa which may after a time threaten life. The pathological condition of the larynx is precisely the

same as that of the patient Harriet C. (page 32), but in her case the cause of the mischief appears to have been laryngeal abscesses, and I have, consequently, thought it better to consider it along with the other instances of laryngeal inflammation.

The cause of this affection is either a state of paralysis of the laxors, or of the abductors, or a condition of spasm of the tensor muscles. Whatever the disease be owing to, it is most serious, and, I believe, can only be treated satisfactorily by means of tracheotomy. Topical applications, medicines, or galvanism either do harm or give but temporary relief.

The disease appears to depend on the effect of cold, and may commence with, and be the consequence of, inflammation of the larynx, as in the case of Harriet C., but in the two following cases, I really could not satisfy myself as to there having been any laryngeal inflammation.

Eliza S., an out-patient of the Consumption Hospital, has been suffering from pain and difficulty of breathing for the last two years, and has occasionally a husky laryngitic cough, her voice is very harsh, and in a high pitch, which she can modulate tolerably well; breathing stertorous; it is obvious that the muscles of respiration have an obstacle to overcome at the larynx. Has seen several medical Practitioners, and some diagnosed asthma. I obtained a good view of the larynx with the laryngoscope; its mucous membrane was in no way red or swollen, the cords were distinctly visible and tightly stretched, close to each other, being powerless to move apart for the admission of air; there was just a narrow chink between them, very insufficient for the purposes of respiration.

The examination of her chest showed her lungs to be

healthy, although with slight deficiency of resonance on both sides; there is no hereditary predisposition to phthisis, and no phthisical appearance about her features; respiration (on the 5th of February, 1868) 26 per minute; her cough has a laryngeal croaking sound, and is free from the usual catch, obviously because she cannot close completely the laryngeal opening, and she says her friends complain of her making a loud noise in her throat during sleep, which is not exactly like snoring.

With the idea that the paralysis of the cords was due to want of power in the abductor muscles, I attempted to galvanise the cords, but this produced so much discomfort that I had to desist and try the action of galvanism externally, as near as possible along the tract of the recurrent laryngeal nerves. After passing a rather strong current for twenty minutes, she thought her respiration was a little easier and made rather less noise on breathing. The application of galvanism was repeated externally the next day for twenty-five minutes. Two days later (1st February) she informed me that her breathing had improved, although it was not quite so free as the day after she had been last galvanised. I again galvanised her, and passed a current between the back of the tongue and the thyroid cartilage for eight minutes, which she bore well, and appeared to be productive of benefit. On the 5th February—dyspnœa rather urgent, and does not feel quite so well. After galvanising her externally along the neck, as previously, for twenty minutes, the breathing became quite easy, and there was no longer any laryngeal sounds in the act of respiration. 20th February, her friends say her breathing at night is less noisy; feels much the same as when she left me on the former occasion. To-day gal-

vanizing the tongue causes spasms of the glottis, and complete suspension of the respiration; advise her to douche her throat externally with cold water, procured from the tap by means of an india-rubber tube, supplied with a rose end-piece. February 14th, less difficulty in breathing, and can walk faster without inconvenience from shortness of breath; decidedly less of the stertorous breathing during sleep. The throat has become very irritable, and there is some difficulty in the use of the laryngeal mirror; the cords are much in the same condition as before. She has applied galvanism to her neck daily since last report.

June 15th, or four months later, she called on me again on account of her throat, which was much in the same state as when she first came under my care. A laryngoscopic examination shows no improvement in the state of the cords. Is pregnant, and suffers from slight hæmoptisis in the morning, after violent retching.

I now advised her to apply ice to the spine, a blister to the back of her neck, and prescribed quinine, but then lost sight of her. I believe that tracheotomy would have been attended with satisfactory results.

On the 30th May, 1868, I saw John M., aged 36, an out-patient of the Brompton Hospital. Has been for fifteen years at sea, and subjected to a great deal of hard work on board ship, but never had any serious fall or other injury. Has left off the seafaring life for the last ten years. Has enjoyed good health; no hereditary predisposition to phthisis; never suffered from hæmoptisis. Three months previously began to experience some difficulty in the act of respiration, and gradually became hoarse, though without pain in the throat. I first saw this case with my colleague, Dr. Symes Thompson, who finally referred him to me. A

good view of the larynx was obtained. The vocal cords were observed to be tightly stretched and nearly immovable, so that they remained about one-eighth of an inch apart, beyond which extent the glottis was powerless to open. No obvious redness, no ulceration, but an acute follicular condition of the back of the tongue.

On going up and down stairs rather quick, and during the act of swallowing, is frequently seized with a sensation of choking, evidently from spasmodic closing of the glottis. On these occasions the chest heaves without any air being admitted into the lungs, and he is obliged to remain quite quiet until the spasm has subsided, when the breathing returns with a whistling noise. Phys. signs: a questionable shade of dulness at the right side, and expansion somewhat less on that side than on the left; some few mucous rales on the left side; indeed, there were no positive symptoms of any pulmonary affection; complains of a peculiar sensation, though not exactly of pain, at the back of the neck; much stertorous noise during sleep. Having tried the effect of galvanism from the back of the tongue to the thyroid cartilage, a violent and alarming spasmodic closure of the glottis occurred, and I had to desist at once. With the idea that the state of the cords in the present case was owing to some functional affection of the spinal cord, I now passed a galvanic current between the back of the tongue (N. pole) and the back of his neck, for seven or eight minutes, which occasioned no spasms of the larnyx. I next applied ice to the back of the patient's neck for thirty-five or forty minutes, producing decided relief, as after this, going up and down a first flight of stairs was followed with less spasm of the glottis than before. To syringe his larynx with a solution of 90

grains of sulphate of zinc in 4 oz. of water. June 3rd: Has applied ice yesterday for three hours to the nape of the neck, but this time without much apparent relief; thinks he is deriving benefit from the injections into his throat. Altogether considers himself decidedly better; less stertorous noise at night, and less dyspnœa when walking fast. With the Laryngoscope, the cords are seen in contact at their anterior extremities, diverging to about one-fifth of an inch at their posterior ends, forming a V-shaped opening. I lent him one of Pulvermacher's galvanic necklaces, although without anticipating much relief from its use. June 6th: Prescribed two grains of quinine to be taken three times a day, and a blister to be applied to the nape of the neck. June 8th. A decided improvement in swallowing—none, or but faint spasms of the glottis,which were so urgent, at first, as to threaten suffocation. Says the uneasy sensation at the back of the neck has nearly disappeared; the breathing is easier and the cords have more power to recede from each other at their posterior ends. On a careful examination of the larynx, the epiglottidean folds appear rather swollen. Five grains of iodine of potassium to be taken in a mixture three times a day, instead of quinine; and about that time tincture of iodine was prescribed to be applied to the neck.

Since then, the same treatment was pursued uninterruptedly. On the 19th of June three blisters had been applied in succession to the back of the neck. Could breathe quite freely (showing less tension of the cords) even on fast walking. On drinking, the slightest spasm is noticed, which might pass quite unobserved.

On the 21st of June this patient returned to work as a scaffold-builder. He called on me on the 26th, when

unfortunately, the former symptoms had partly returned. There was, moreover, a degree of congestion in the right lung, as evinced by some dulness on percussion and faint respiratory murmur; posteriorly right side, feeble harsh breathing; left, deficient vesicular murmur. Temperature under the tongue 98° 7.

This case is very interesting as showing the satisfactory result to be obtained from counter-irritation applied to the spine, and bodily rest, ensuring a quiet state of the circulation. As soon as the circulation was exerted afresh by manual labour, the symptoms returned; indeed, throughout the whole history of this case, exercise was productive of mischief by causing an increased condition of the laryngeal spasms, apparently due to some reflex nervous action caused by the want of balance between the expansion of the lungs and the action of the heart, the supply of blood to the lungs being increased by exercise, while the lungs could not expand proportionably. On recovery from suspended animation or suffocation from drowning, and therefore under circumstances somewhat similar to those of the present case, where the balance between the circulation and respiration is interfered with, spasms of the glottis are occasionally met with. I have witnessed a case of this kind after submersion in the Serpentine, assuming such a threatening aspect as to make it questionable whether a recovery would ultimately take place. An account of the case was published in the 'Medical Times' for 1857, which I have thought it worth while reporting on the present occasion.

There were a number of skaters on the Serpentine; at five minutes past three o'clock I suddenly noticed three gentlemen in the water, the ice having just given way at a spot distant of about thirty yards from

the bridge on the east side, and not far from the middle of the river. The sufferers were struggling in vain to obtain a footing on the ice, when another gentleman came up with the intention of impressing upon them the necessity of remaining quiet, holding to the ice with no more than their heads above water. As he approached the place, the ice broke and he also was immersed. About two minutes afterwards the Humane Society's apparatus was on the spot, and the four individuals seized its projecting ladder, but unfortunately, the ice being very thin, it was found impossible to drag the apparatus out of the water. A rope was consequently thrown to them, and they were thus all one by one rescued from their perilous situation, the immersion having lasted about ten minutes.

On admission to the receiving house of the Humane Society, where the party was immediately taken, they were all in a state of great debility and shivering with cold, respiration quick and short, pulse hardly felt at the wrist, face of a deadly pallor, and the body, especially the extremities, quite cold. They were undressed, and placed in a warm bath at 80° F. for about a quarter of an hour; those whose circulation was still languid I directed to be rubbed while in the warm water. The first effect of the bath was to hurry the respiration, and then the circulation became gradually more active. On being removed from it they were put to bed, when there was a return of cold shivers, which gave way to energetic and continued friction with the hands; afterwards two of the patients slumbered, one slept, and the fourth continued in a very precarious condition for fully an hour and a half. In three cases there were symptoms of syncope from excessive cold, in one symptoms of syncope and asphyxia.

The sufferer whose condition was most alarming had, it appears, in his attempt to lay hold of the ladder, twisted round his neck a rope belonging to the apparatus, and was kept some time under water. His respiration was comparatively free until placed in the bath, when an attack of spasmodic closure of glottis occurred; a few minutes after being removed to a bed, he was suddenly seized with a second similar fit, accompanied with severe symptoms of asphyxia, respiration was then next to completely arrested, the face became blue, with the tongue protruding, a very faint pulse could be felt at the wrist, the thorax was arched forward, the efforts to breathe being very distressing, there was also loss of consciousness and slight convulsive motions of the arms. The attack lasted between eight and ten minutes, just enough air being admitted at rare intervals to the lungs to keep up life during the time. When breathing returned there was slight delirium, with incoherent muttering, and then an indescribable expression of joy appeared on the patient's face, but a few minutes afterwards a third similar attack occurred, though not so strong as the other. He was subsequently seized a fourth time with the same symptoms, the fits being weaker on each occasion. During these paroxysms I had the patient supported in a sitting posture, and rubbed violently all over the body, which was easily done from the number of attendants present. During the intervals between the fits he had brandy given to him, and ether to smell, which afforded considerable relief.

The ether, however, was withheld during the fits, as it increased the distress by exciting the respiratory actions without relieving the spasms of the glottis. A mustard poultice was also applied to the chest. After

a little more than an hour the attacks ceased, and the patient conversed with a friend, answered my questions, and gradually fell asleep. His pulse had then increased considerably in strength, and his respiration become quite free. He was in this state when I left the receiving house, and I ascertained since that he had no return of the attacks.

I may remark that the spasms first took place in the bath, which hurried the respiration, the circulation being too weak to be able to keep pace with it. It is, I believe, this disturbed equilibrium between the two most important functions of the body which caused the laryngeal spasm.

The following case is particularly interesting, as not only the voice, but the power of speech had been completely abolished for a period of over one year, the patient being perfectly dumb; as will be seen, he recovered his voice and speech from one application of galvanism.

The account of this case was communicated to the Clinical Society, and a committee was appointed to inquire into it.

The following history of the case is extracted from the Transactions of the Clinical Society for 1868:—

A Case of Temporary Dumbness successfully treated by Galvanism.

William Jones, aged 47, a hawker of umbrellas and cloth caps for the last thirteen years, formerly known, I understand, for his powerful voice. His mother died of phthisis, and his father is still living in a very weak condition. A sister died lately, although not apparently from disease of the lungs; she spoke in a very low whisper on several occasions for three or four

months at a time. He is subject to occasional hoarseness in winter. Twelve years ago was treated for pleurisy of the right side, in the Victoria Park Hospital, where he remained over three months, and continued attending as an out-patient for two years, after which time he had quite recovered. On October 1, 1866, he had a severe fit of coughing, lasting for three hours; his tongue then began to enlarge, and he observed a hard mass (probably a swollen gland) which had formed under the right lower jaw. Within an hour after he had left off coughing, the tongue had reached such a size as nearly to fill the cavity of the mouth. His power of speech was then, for the first time, considerably interfered with, his tongue was benumbed, and he had in a great measure lost the sense of taste. A medical Practitioner at Clapham, who saw him at the time, said he was suffering from inflammation of the lungs. Three days after the first symptoms set in, he began to expectorate blood, and was troubled with hæmoptisis for two months. The condition of the tongue and swelling under the jaw continued for about a month, and then disappeared with the return of the sense of taste to its normal condition. His speech became rapidly worse; he had for about three months the power of uttering sounds, although not of forming words. Gradually he found it impossible to produce sounds, and he was consequently speechless—the last being high notes in the scale, uttered in quick succession—and this state lasted from December, 1866, until February 26, 1868, when I saw him.

For about fifteen months his general health has been tolerably good; but up to Feb. 26th of the present year (1868) he has been totally dumb—not one word or the least sound, with, perhaps, the exception of a slight

hiss, has he uttered for a year. He has also observed his power of swallowing to be much diminished, and this state of dysphagia has lasted about as long as the dumbness. At the same time, he was also very frequently troubled with spasmodic contractions of the pharyngeal and laryngeal muscles, which were produced by the slightest cause, as, for example, the least attempt to speak. He would then throw his head backwards, and place his hand upon his neck, grasping the larynx, with an expression of pain. He has continued obtaining his living as a hawker, presenting a card to his customers, on which was written that he could not speak, although he could hear, and conveying his answers on a slate.

The patient has sought medical advice for his dumbness, without obtaining relief, at Clapham, at Guy's Hospital, Middlesex Hospital, and the Victoria Park Hospital; but, in despair, he has consulted nobody for the last nine months, until lately, when he applied, as an out-patient at the Brompton Hospital, mainly for relief on account of his chest. I made a laryngoscopic examination of his throat, and could find no apparent mischief of any kind beyond a slightly pendulous condition of the epiglottis. The vocal cords were quite sound, and their motions in the act of respiration appeared perfectly free. I requested him to try and speak, and observed he had no power to raise the tongue against the palate. He tried to move the tongue and lips, with the object of speaking, but was immediately seized with a laryngeal spasm, and no sound was emitted. The physical signs of the chest, investigated a few days later, were as follows :—On both sides, anteriorly, rough breathing, with loud expiration; no moist or dry sounds, and no dulness on percussion.

Posteriorly, on the right side, slight dulness, but to a very limited extent, near the end of the spine of the scapula, where he says he occasionally feels a sharp, shooting pain, darting through the chest; respiratory murmur very deficient at that spot, elsewhere posteriorly breathing harsh, but no dulness. He is not emaciated, and exhibits no particular debility.

I at once thought of trying what galvanism could do in the present case, and, by means of Mackenzie's curved laryngeal galvaniser, I passed a tolerably strong interrupted current (from a one-cell Smee's battery) between the back of the tongue, near the epiglottis and the thyroid cartilage. After a few minutes (certainly less than a quarter of an hour), the patient suddenly sung out a note in a high key, followed by others—short, and in a rapid succession,—and, with an expression of infinite delight, he pronounced, with some trouble, the word 'Yes.' Almost immediately afterwards he said, tolerably distinctly, 'I can speak.' In less than twenty minutes later his speech was, I may say, quite restored. During that period I passed the galvanic current on three or four occasions for about a minute at a time; after each application the voice improved.

On requesting him to analyze his sensations, he said that the first feeling of the returning power of speech commenced at the upper part of the right side of the chest; this appeared to him as a fluttering under the right sterno-clavicular articulation, proceeding upwards along the windpipe, and stopping at the throat at a point corresponding to the vocal cords, where he had a feeling which he described as "pulling," and immediately afterwards he pronounced the first words.

I had previously observed that, on percussing the right side of the chest, near the apex, a spasm of the

laryngeal muscles was produced; after the power of speech had returned, this phenomenon diminished rapidly. The mere touch of the larynx, while he was dumb, sufficed to bring on the spasms, but now this effect quickly diminished. Two or three days afterwards the spasms could seldom be induced, and were but very feeble.

Having given him some food, he told me he could now swallow easily and comfortably. He remained with me for about three hours that day, after his speech was restored, speaking quite plainly, and only finding some difficulty in recollecting words after having been speechless for so long, and I at once wrote out the notes of his case.

Since then this patient has returned to me several times. I have again galvanized him once, but his voice does not require it; he speaks quite fluently, and in a natural tone. He visited me at the Consumption Hospital in the beginning of the present year (1869). There had been no return of the dumbness, and his voice was good.

Whatever be the ultimate cause of the dumbness in the present case, it appears to me due to overstraining of the nerves and muscles of the larynx from excessive exertion of vocal powers. I have borne in mind the circumstance that this might be a simulated case, a presumption which, however, does not appear to me consistent with the medical history of the patient; but, in order to obtain additional security on this point, the patient, at my request, has procured for me a number of signatures, amounting to twenty-four, to the following document:—

'I have known William Jones, of Clapham, to be totally dumb, and unable to utter the slightest sound

(beyond, perhaps, a mere hiss) for a period of over one year, ending in the last week of February of the present year.

'March 2, 1868.'

The signatures are all, I understand, of respectable inhabitants of the neighbourhood of the patient's residence, each of whom has appended his address.

REPORT ON DR. MARCET'S CASE, READ MARCH 27, 1868.

The committee appointed to consider and report on Dr. Marcet's case of dumbness cured by galvanism, have made extended and careful inquiry into it.

With reference to the essential symptom of the case, they find (1.) reason to believe that the man did not speak for many months; as to (2.) the subjective condition of ability to speak, the fact cannot be brought to direct proof. The man's general veracity has been tested by various inquiries independently made, with the results that most of his statements concerning his condition and doings (though not all of them) are confirmed. It is evident that he has used his infirmity (whether real or assumed) for the purpose of obtaining charitable relief.

The Committee submit the case to the consideration of the Society, with a confession of their inability to form a judgment on its nature. It has, however, been the subject of such careful examination, first by Dr. Marcet, and now by themselves, that they think it should be placed on record for comparison with any similar instance in the future.

GEORGE BUCHANAN,
W. S. CHURCH,
E. SYMES THOMPSON.

Although *aphasia*, or loss of speech without aphonia, is really unconnected with diseases of the larynx, and consequently foreign to the subject of the present Essay, still, from the circumstance that medical Practitioners known to give attention to affections causing loss of voice, are likely to be consulted also for loss of speech, as shown by my own experience, I may be excused for introducing a case of aphasia, which, I trust, may not be found devoid of interest.*

A Case of Aphasia.

Henry H., aged 34, a tall, stout brewer's drayman, with broad neck and shoulders, called upon me about the 24th May, 1868, entering the room with a steady gait, although swaying his body in a sailor's style. He has suffered from frequent attacks of rheumatism in the wrist and knees, but has enjoyed good health in other respects, and has lived a sober life; exhibits the appearance of a somewhat blunted intellect.

Two months previously he lost his speech in a fit, which was followed by a temporary failure of muscular power in every limb, beginning in the right side. I obtained from the patient's wife the following account of the fit. She thinks the attack was brought on by annoyance and anxiety, owing to the report of an individual having been seen to enter his premises with a stolen coat, and the interference of the police on that account. The event happened nine days before he fell ill. She had not noticed any previous loss of memory or blunting of his intellect. On the morning of the day on which the attack occurred he awoke quite well, but at about six o'clock, just before rising, began foaming a little at the mouth, and his wife at once noticed he

* This case has been published in *The Lancet* for Jan. 23rd, 1869.

could not speak, his mouth being drawn to the right side; almost immediately afterwards he fell into a deep sleep for about an hour. When he woke up his right arm and leg were powerless; he lay in a state of semi-consciousness till next morning, when his senses began to return, although the mouth remained drawn to the right side. After the attack had passed off, she observed he could hardly protrude his tongue at all, and barely open his mouth to any extent. He could swallow fluid food, but for some inexplicable reason refused obstinately to take any solid food. The intellect was obviously then blunted. Three days after the fit, his left side became also paralysed, without, however, the occurrence of any further attack. A week after the original seizure he began to improve, and strength gradually returned, beginning in the right side. He was confined to his bed for a fortnight. Present condition:—In answer to my questions, he says, indifferently and indistinctly, either 'yes, sir,' or 'no, sir,' apparently without a clear notion of what he wishes to express. He attempts certain sounds resembling words, but takes one word for another, without being aware of his mistakes. Thus, when told to repeat the word 'come,' he says 'pun;' instead of 'to-day' he repeats first the word 'pun,' and on my telling him of his mistake, he says, 'besses,' and this word 'besses' comes on constantly when he tries to speak. Asked to repeat the word 'lamp,' he says, 'pass,' or something like it. Can move right and left arm now, quite freely, and gives a good grip with both hands. His tongue is protruded quite freely and straight forward, although when he puts it out quickly there appears to be, at first, a very slight deflection to the left; the motions of the tongue take place normally,

sideways; can raise the tip of the organ, but not to such an extent as to touch the palate; there is no swelling of the tongue.

As to the state of the larynx, his vocal sound is harsh, in a low key, which he cannot raise beyond a tone or two. Deglutition perfect. Examined with the Laryngoscope, the vocal cords cannot be viewed, and when he makes a sound, instead of the cords being seen to move towards each other, the larynx is observed to close, beginning, apparently, with a contraction of the glottis in an antero-posterior direction, instead of its becoming narrowed by mutual approximation of the cords from the sides, as occurs in the act of phonation; this showing either a state of weakness in the adductor muscles of the cords, or, which is more likely to be the case, the absence of the cerebral power, which may be considered as instinctive, to co-ordinate the action of the different muscles of the larynx. When wide open, the patient's larynx appears more circular than usual and admits of a good view of the rings of the trachea.

With the object of ascertaining the relative degree of cutaneous sensibility in different parts of the body, I brought the two points of a pair of compasses to bear simultaneously on the skin, varying the distance between the points, and inquiring whether the patient felt them both distinctly, or whether he was conscious of a sensation as if produced by the contact of one point only. He conveyed his answers by raising one or two fingers as the case might be. On both arms the two points of the compasses were distinctly felt when five-eighths of an inch distant from each other, but the extreme degree of sensibility in the right arm reached five-sixteenths of an inch, while it was not so with the left, showing

rather less cutaneous sensation in the left, than right arm. On the right calf the two points were felt at three-eighths of an inch, while in the left only at one inch and a half; the feeling in the skin of the left leg being therefore less than in the right. Sensation tolerably normal, though not quite so at the tip of the tongue, where the two points are felt distinctly at a distance of three-sixteenths of an inch.

I decided upon trying at once the effect of galvanism with Smee's battery and an interrupted induction current, the negative electrode being placed on the back of the tongue and the positive on the nape of the neck, I used Mackenzie's galvaniser for the tongue, and his band was fastened round the patient's neck, the sponge being in contact with the spine. After passing the galvanising current for two minutes, he could say, 'a, b, c, e, f, g, h, i, l, m, n,' indistinctly; 'o, p, r, t,' indistinctly; 'v,' and 'k' after a little trouble. After passing the current for five minutes longer, I tried him again, with similar results. Repeats the word 'No' after some little trouble, and the word 'to-day' occasionally, very well.

May 28th.—I galvanised him for twenty minutes in the same way as on the first occasion. Then he says 'a,' after having shown him that his lips must be kept open; for 'q' says 'two.' Cannot yet say 'd;' and 'k' is very imperfect. He has much trouble in pronouncing the letter 's.' I made him say 't' correctly several times in succession, and then told him to pronounce the letter 'm,' and he then said 'Tim,' or 'Tom.' After waiting for a few seconds, he gave me 'm' very well for the first time that day. While I was putting on the band round his neck for the second time on this second visit, he said

quite distinctly, 'That's it, sir'; but I never could make him repeat that sentence. After galvanising him for two periods of a quarter of an hour each, I tried to make him count from one to fourteen, which he did more or less perfectly, mistaking one figure for the other.—To take a mixture of steel and quassia.

May 31st.—Lungs found healthy, with slight sibilus in front on the right side; pulse 80, good; both pupils observed to act quite freely; urine natural colour, clear, no albumen.

June 3rd.—Improving slowly. It is very obvious that his speech is invariably better after he has been galvanised than before. After being galvanised he recited the letters of the alphabet and counted to ten very well.

June 15th.—Has been galvanized four times a week, can now apply his tongue to the roof of his mouth, and say a few simple words, but breaks down with a sentence. Since June 5th, the medicine has been omitted, and has been taking half a grain of proto-iodide of mercury, in pill, twice a day. A blister to be applied to the back of the neck, and the pills to be continued.

July 13th.—A decided, although but gradual, improvement. Can repeat very short sentences of words in one syllable; evidently, however, finds it difficult to conceive how ideas are to be expressed in language; no headache. The treatment with galvanism and iodide of mercury is continued.

August 5th.—Continues to improve in his speech. The first letter of certain words frequently dropped, such as 'l' in 'let,' and 's' in 'sound.' I succeeded in correcting this defect by trying in succession several words beginning with an 'l,' such as 'like,'

'loose,' 'loan,' and after a time, having found one which he could pronounce, he was directed to repeat it three or four times in succession. I then returned to the word 'let,' which he could now express quite distinctly and correctly. I obtained from him to say correctly the word 'sound,' by proceeding in the same way with that word respectively, as I had done with the other.

I was now going to take leave of my patient for a few weeks, and explained to his son, a grown-up lad, that by adopting my plan of tuition with his father, he might assist materially towards the recovery of his speech. It is doubtful, however, whether this was done.

November 16.—For six weeks Henry H. has been an in-patient at St. Bartholomew's Hospital, suffering, he says, from a severe attack of gout, during which time the right arm and leg were very weak, and has only left the hospital a few days previously. Notwithstanding this circumstance, his speech has continued improving, and he can now express himself tolerably well, although some words must be guessed at.

November 26.—Tested the sensibility of both arms with the points of scissors, and found it about the same. The right arm decidedly weaker than the left. To take liquor strychniæ ♏iij in an acid mixture.

December 3rd.—Has had three epileptiform fits, occurring on the same day, the first of which, he says, took place half an hour after taking the first dose of the mixture. The attacks began with an involuntary flexion of the right arm and leg, while the left side remained motionless. He foamed at the mouth, and became blue in the face, remaining insensible for about twenty minutes. No more than a slightly increased

weakness of the right side followed these fits, and the day after, it is remarkable that he considered his speech decidedly improved, although he thinks he cannot now speak quite so well as he did on that occasion. To take one-eighth of the dose of the strychnia mixture.

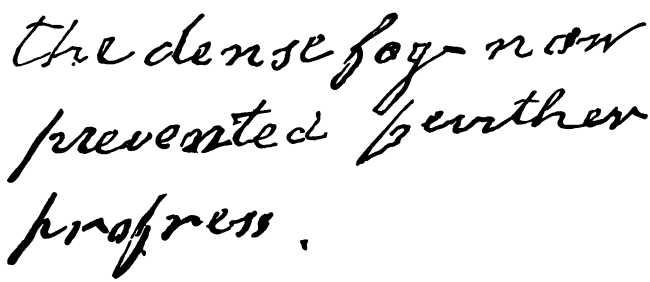
December 9th.—No return of the fits. I had previously tested his power of reading, and now found it much improved; indeed, he reads fairly and fluently so long as I point out the words to him, although he is rather slow with some of them. Speech to-day much better than I have ever heard it yet, although the weakness in the right side is rather increasing. To take half the original dose of the strychnia mixture.

December 23rd.—I inquire into his ability to write, and request him to write, with pen and ink, the words 'I can speak.'

The following is a facsimile of his attempt:

He held his pen properly, but it is quite impossible to make out the words, with the exception of the first *i;* he understood, however, that there were three separate words to be written. I next requested him to think of a sentence, and communicate it to me in writing; he then wrote as follows:

which, he said, meant 'I am better.' There is here not even an attempt at writing three distinct words. I now asked the patient to copy a sentence from a book, and he wrote:



which can easily be made out as:—'the dense fog now prevented further progress.'

With respect to his muscular power, can just raise and keep up eleven pounds weight with the right hand, while he finds no difficulty in managing that weight with the left, which indeed could lift much more. He informs me that before falling ill he could raise 700 lbs. and more. His arms now measure round the contracted biceps—the left $12\frac{1}{2}$ inches, and the right 12 inches. The weight of his body is at present 13 stones, $10\frac{1}{2}$ pounds; and he says that previously to the first fit he weighed no less than $18\frac{1}{2}$ stones. The tongue points slightly to the right when protruded several times in rapid succession. The state of his cutaneous sensibility on that day is worth noticing. The two points of the compasses being placed at a distance of two inches from each other were felt more distinctly on the left fore-arm than on the right. On the right calf the two points were perceived at a

distance of $2\frac{5}{8}$ inches, while on the left at a distance of $1\frac{5}{8}$ inches, showing the perception of sensation to be less on the right arm and leg than on the left; muscular power being also less in the right than in the left side.

January 2nd, 1860.—Power in right side returning, can grasp my fingers firmly with his right hand, and hold up a weight of fourteen pounds easily. Speech perhaps not quite so free, which is obviously due to family troubles which he has had of late; wishes to go back to work.

This case is still under treatment. So far the result is satisfactory, as the patient's speech has recovered to a sufficient extent to allow of his making himself understood. His general health is much improved. The treatment which appeared to act most favourably was the application of galvanism. I doubt whether he derived much benefit from the proto-iodide of mercury and the tonic medicines. The strychnine was certainly not the cause of the last fits, and appears to have been instrumental in promoting the recovery of the power of the right side.

Remarks:

There is nothing essentially different in this particular instance from what is met with in a number of cases of aphasia now on record. In the present case we have at first some loss of power and sensibility in the left side, but subsequently the right side becomes affected to a greater extent than the left. My observations of the patient's power of writing were suggested, in some respects, by those of Dr. W. T. Gairdner, related in his admirable paper on aphasia. My patient could not write under dictation, but failed still more in

his attempt to write a sentence he had himself construed in his mind, although the idea was clear enough as he spoke out the words plainly afterwards. He could, nevertheless, copy tolerably well from a printed book, showing not only that he had learnt to write, but also that the muscles of his right hand were not paralysed. This observation agrees with the results of most clinical writers on aphasia, who consider the disease due to an absence of the mental power necessary to co-ordinate and direct the action of the muscles concerned in the utterance of speech, and not to a state of paralysis of those muscles, or to a condition of abeyance of the faculty of the brain of forming ideas.

The clinical history of aphasia is one fraught with interest; but any further remarks would be useless, after the very interesting and valuable paper of Dr. Maudsley on aphasia, communicated to the London Medical Society, and published in *The Lancet* (1868). I might just add one more argument in confirmation of this gentleman's views, derived from the present case, which, I think, is of some weight. Here is a patient who cannot write, except when copying, and still he can speak, at times, very plainly indeed. Admitting, for the sake of the argument, the power of speaking and writing to be localised in the left anterior lobe of the brain, and the disease under our present consideration to be owing to an organic affection of that cerebral organ, we should have to conclude that the lesion was cured, or much relieved, as far as the speech was concerned, although not with respect to the writing, or that the diseased left anterior cerebral lobe could not guide the fingers in the act of writing, although it could, to a tolerably fair extent, direct and control the muscles of the tongue and mouth concerned in the

act of speaking—either of these hypotheses being impossible to admit.

There appeared to be a slight want of power in the muscular action of the tongue when the patient first applied to me; but this soon passed off, and cannot be considered as the real cause of his speechless condition.

PART III.

LARYNGEAL PHTHISIS.

One of the main objects of the Laryngoscope is to afford, frequently, a ready means of assisting in the diagnosis of pulmonary phthisis, and occasionally a laryngeal inspection may enable an opinion to be given as to the existence of consumption, previous to there being any indication of the disease from the investigation of the physical signs of the chest.

I do not wish, however, to infer that the throat is affected in every case of phthisis; so that if suspicious physical signs were not confirmed by some mischief in the larynx, the case should be at once dismissed as non-consumptive; but if in addition to doubtful pulmonary symptons as determined by auscultation and percussion, we find a certain degree of congestion, redness, or irritation of the larynx, together with the secretion of a whitish, mucous, and perhaps incipient tubercular granulation; these signs, which are only visible with the Laryngoscope, will greatly assist towards forming a diagnosis; and if the throat-symptoms have lasted for some length of time, their meaning is unmistakeable.

Dr. Scott Alison* has observed the great frequency of morbid conditions of the throat in pulmonary con-

* *Morbid Conditions of the Throat, in their Relation to Pulmonary Consumption.*

sumption. Dr. Cotton * considers laryngitis as one of the most formidable symptoms of phthisis; he observes that it is unfrequent during very early and very advanced life—the age of from twenty to thirty years being the common period of its occurrence.

The doubtful physical signs of pulmonary consumption, which a laryngoscopic examination is often useful in confirming, may be considered as follows:

1. Obscure or deficient respiratory murmur, without abnormal sounds, and with doubtful dulness on percussion.

2. Crepitation at apices, with or without vesicular murmur, and with no dulness on percussion.

3. Shade of dulness on percussion, with respiration harsh, although it may be fairly vesicular on deep breathing; and without acute symptoms.

4. Long-continued symptoms of bronchitis, with apparent crackling, although there be no dulness on percussion.

Should any of the above groups of symptoms be attended with hæmoptisis, the presumption as to the existence of tubercles will be increased; but hæmoptisis cannot be regarded as a positive indication of consumption. Cases are constantly coming under our notice exhibiting one of the above four groups of symptoms. The thermometer is of assistance in these doubtful cases, and so is the weighing-chair; still any additional means calculated to assist us out of the present difficulty must be of much practical value.

Now, the appearance of the larynx in many cases of phthisis, and long before any positive physical signs of the disease have set in, is peculiar. It is not that the

* *On Consumption, its Nature, Symptoms, and Treatment.*

patient necessarily complains of sore throat, or pain in the larynx, or of difficulty or discomfort in the act of swallowing, or of loss of voice; but these cases usually begin with weakness of the vocal cords, so that a word may be dropped during conversation; or, in the act of singing, it will be found more and more difficult to bring out loud and clear notes, until singing must be given up entirely. As the voice becomes weak, it is also altered in its pitch, assuming a cracked or a low harsh tone. It may disappear altogether, either from weakness of the tensor muscles of the cords, or from the adductor muscles failing to act to a sufficient extent, on account of the swollen condition of the supra-glottic mucous membrane. Under these conditions a word breaks out now and then, but most of the sentences are spoken in a whisper. On the voice beginning to fail, a constant desire to clear the throat may be noticed, to get rid of a thick mucous substance which forms in the larynx, and is the cause of unceasing discomfort; and, as the disease progresses, the secretion goes on increasing and becoming thicker. Such is, in a few words, the usual course of the laryngeal affection in the early stage of consumption, as far as it can be determined without the aid of the Laryngoscope, and often before tubercles have formed in the lungs to such an extent as to allow of the certain diagnosis of the disease by the mere investigation of the physical signs of the chest. These indications will assist in forming a diagnosis, but a view of the larynx will yield far more precise information, and I should recommend that patients exhibiting obscure and doubtful physical signs of phthisis, together with symptoms of commencing mischief in the larynx, be submitted at once to a laryngoscopic examination.

The very first sign of positive laryngeal phthisis, as observed with the Laryngoscope, appears to be a dotted or granular condition of the epiglottis. Instead of the uniform pale flesh-coloured appearance of its under-surface, it may be observed to be red and congested and speckled with white, or paler spots, about the size of a mustard-seed, irregular in size and shape, and often not distinctly marked; they may convey the impression of small points of thickened pus under the mucous membrane, which a prick would be sufficient to let out; and appear to me most obvious near the rim of the epiglottis. At the same time, the posterior surface of the supra-glottic region of the larynx will be noticed to secrete a thick substance, whiter, and not so translucent as mucus. This substance, when formed in sufficient quantity, flows partly towards the vocal cords, partly into the œsophagus, and is seen issuing through the commissure—between the arytenoid cartilages. The larynx is sound in every other respect, with the exception perhaps of a commencement of thickening of the arytenoid cartilages, or epiglottidean folds. At this stage of the laryngeal affection, the patient will very probably complain merely of the voice becoming weaker, and of the annoyance caused by the constant hemming required to get rid of the mucous secretion.

This condition of the larynx may remain chronic while the pulmonary disease continues progressing; but, in general, in the course of from a week to a month or longer, a slight thickening will be seen in the epiglottis, its folds, and in the arytenoid cartilages, and the granular condition of the epiglottis will be observed to extend to the neighbouring parts; at the same time the mucous secretion increases and becomes whiter. It is at that period that the voice becomes very weak,

or altered in its tone, there is obviously a want of power in the tensor muscles of the cords; and, as I have already observed, the swollen arytenoid cartilages, by preventing the free approximation of the cords, interfere considerably with their vibration. The false cords naturally become involved, but they appear to me to be often affected after the disease has settled in the epiglottis, its folds, and the arytenoid mucous membrane.

About this time cough sets in, or if the patient has been troubled with cough, it becomes worse; a slight pain is observed in the throat during the act of deglutition; there is some dyspnœa, and on auscultation, a crepitation in the apices of both lungs may probably be observed, perhaps with a shade of dulness on percussion in one or both sides.

I believe this is a course which incipient phthisis frequently runs; but the difficulty of getting a series of typical cases is, I need not say, very great; it must be remembered also that there is much trouble in investigating such subjects on a sufficiently extensive scale, on account of the time required to make a good laryngoscopic examination. Where the observer wishes to have a view of every part of the larynx, in order to satisfy himself as to their condition, as must be done with the object of describing a laryngeal disease, he must necessarily devote much more time and labour to the laryngoscopic examination than if he merely wishes to ascertain the state of the larynx solely with the view to its treatment, as is done in ordinary practice.

I have seen the laryngeal disease assume a kind of chronic form, without mending or increasing. In a case to be subsequently described, exhibiting at first no clear symptom of phthisis, the epiglottis was much thickened and studded with the characteristic white

granulation; the other parts of the larynx were also much swollen, and the laryngeal cavity had quite lost its shape. I carefully examined the patient's chest, and could not find, at first, any indication of pulmonary phthisis, but I felt sure that sooner or later tubercular disease in the lungs would be detected. My surmise proved right; but the symptoms of the pulmonary affection assumed the same form as those of the larynx, being remarkable for their chronicity. When the larynx has become much thickened, the vocal cords are very difficult to see, because, as previously observed, in the act of phonation, the whole of the larynx closes in order to assist in the approximation of the cords. I have been enabled under these circumstances to view the true cords, by causing the patient to utter a sound, and take a deep inspiration several times in succession, when the true vocal cords could be seen, as they failed to recede quite so rapidly as the false cords.

It often happens, however, when the false cords become thickened, that the true cords lose their pale lustre, and they may become very much narrowed, so as to assume a rudimentary aspect. It is remarkable with what an atrophied condition of the vocal cords sounds may be produced, although, of course, they are very harsh, of a particularly low pitch, and incapable of modulation. This circumstance must be due to the laryngeal muscles still being possessed of a certain degree of energy, which makes up for the deficient cords; and a fact which appears to bear out this view, is the power of electricity of restoring or improving the voice in cases of aphonia from thickening of the larynx, where rudiments of cords are seen to approximate each other tolerably freely, although the power of phonation be in complete abeyance. I shall relate an

instance showing the beneficial action of galvanism in these cases. I have previously observed (p. 27) that the disappearance of the true vocal cords does not necessarily cause complete aphonia, as the false cords may apparently accommodate themselves, to a certain extent, to the requirements of the voice.

It would be highly interesting to investigate the question as to whether laryngeal phthisis may occur, run its course, and cure, without the lungs or any other part of the body being affected. Supposing the laryngeal disease remains chronic, pulmonary symptoms may break out at any time; therefore, in order to determine whether laryngeal phthisis may be confined to the larynx, we should consider those cases only where the laryngeal disease has been cured. It will be necessary to wait, to decide the question, until the Laryngoscope has been longer in use; and none but patient and long-continued investigation will settle this point. So far, it must be concluded that laryngeal phthisis is invariably accompanied with pulmonary tubercles, or with a tendency to the disease which may cause its outbreak at any time. In accordance with our present idea of tuberculous matter, supposing the small, white, granular masses visible within the mucous membrane of the epiglottis and larynx to consist of this substance, the different separate masses would, after a time, join, and form cheesy deposits without structure, or actual life; then they would soften, leaving a cavity or an ulceration; and, finally, these ulcerations would increase in number and extent, until the parts were destroyed; or, in favourable cases, they might cicatrize, leaving scars in the larynx, when probably nothing would remain but an uncomfortable sensation in the throat, and either a deficient or a hoarse or cracked voice.

Few inquiries would be more interesting, in a medical point of view, than a good series of laryngoscopic observations on two or three, or more, individuals respectively, tracing the changes which occur in the larynx after the first points of tubercular matter have been discovered in it, at the same time keeping a careful record of the state of the chest. At present, we are only able to make up the history of laryngeal phthisis from a number of separate cases, ascertaining the succession of pathological changes as best we can. I have seen a fresh laryngeal ulceration appear where one or several had already formed; but I have not yet had an opportunity of seeing a tuberculous larynx become ulcerated. On the other hand, I have witnessed a certain number of cases of thickening and superficial softening of the larynx from tubercular deposit; in one of them, on a first examination, the epiglottis was observed free from enlargement; shortly afterwards a gradual thickening of this organ commenced, from a deposit of tubercular matter, and after a few days it became very much swollen. No ulcerations were formed in the epiglottis, notwithstanding its swollen state, and highly tuberculous condition; but the mucous membrane of the supra-glottic region appeared to soften away. Other cases of tuberculous thickening of the larynx have been under my care for seven or eight months, and no ulcerations appeared. On the *post-mortem* examination of the larynx in cases of death from consumption, it not unfrequently happens that patches of the mucous membrane of the larynx are observed to have become transformed into a soft, pulpy substance, which can be easily removed, leaving a superficial and irregular breach of tissue. During life, this softening is easily distinguished from ulcerations, as it leads to

superficial excoriations, and has a tendency to spread, without exhibiting the sunken, inflamed appearance of an ulcer with raised and jagged edges. Again, I have invariably observed this softening to be attended with an abundant white, mucous secretion, which partly conceals the excoriations left by the softening tissue, so that it is usually difficult to obtain a clear view of them with the Laryngoscope, while ulcerations are not obscured from sight by any secretion.*

I am, therefore, not in a position to say whether the deposit of tubercular matter in the larynx runs the same course as it is known to do in the lungs, but should be inclined to conclude, from my observations, that laryngeal phthisis may assume either the ulcerated or the thickened form, the latter showing no tendency to soften in chronic cases with a tolerably good general state of health, but undergoing superficial softening where the pulmonary disease is running a rapid course with a strongly marked tubercular diathesis, this being a particularly unfavourable symptom, and one productive of much distress to the patient. On the other hand, laryngeal ulcerations are often painless, and unperceived by the patient, although frequently attended with aphonia.

The chronicity of the laryngeal disease, whether it be a state of ulceration or of thickening, usually continues while the lung-symptoms remain chronic, whatever be

* It must be understood that this softening and superficial wasting away of tissue are not easy to diagnose with the Laryngoscope, and, I believe, they often take place without the knowledge of the observer; the reduction of size and alteration of shape of the epiglottis, I have sometimes noticed in laryngeal phthisis, show a process of extensive softening occurring occasionally in that organ.

the stage of the lung-disease, and so long as the general state of health is tolerably good; but as soon as acute symptoms set in, the condition of the larynx will become more urgent.

There is another form of laryngeal phthisis I have seen in a few cases, the disease being productive of little conical vegetations adhering to the posterior part of the larynx. They form on a raised and thickened patch of mucous membrane, three, four, or more, in number, adhering to each other at their base. These bodies are occasionally seen between the cords, preventing their approximation in the act of phonation, and producing total aphonia.

In cases where I have observed this form of laryngeal phthisis, there was no particular thickening of the parts, beyond that with which the vegetations were connected, and no obvious ulceration. These vegetations appear more amenable to treatment than tuberculous thickening, or tuberculous ulceration of the larynx. A case has occurred in my practice, exhibiting what I believe to be the cicatrix of former tubercular laryngeal vegetations, and I consequently have reason to hope that these vegetations may ultimately be cured, leaving nothing but a ridge, resembling a linear cicatrix. In this case there was at the time no evident signs of phthisis, but its history was such as to make it likely that there had been formerly a tubercular deposit in the lungs.

I thought at first that this remnant of laryngeal disease was due to a cicatrized ulceration; but on following closely a case of tubercular vegetation of the larynx, which greatly improved under treatment, I saw the vegetations, as they diminished in size, show a tendency to resolve themselves into the same patholo-

gical condition I had noticed in the above instance of apparently cured laryngeal phthisis. I should, therefore, be inclined to conclude that there are three different forms of laryngeal phthisis, running their course individually, without, as a rule, merging into each other. The first: the thickened indurated form, which may end with softening; the second: the ulcerated form; and the third: which is characterized by vegetations. Of these three forms of laryngeal phthisis, the last appears most amenable to treatment, then the first, and lastly the second, or ulcerated form. It is very obvious, however, that an improvement in the state of the throat will accompany, and depend in a great measure upon a favourable change in the pulmonary affection. Phthisis is not a local disease, but a morbid diathesis, giving rise to certain pathological changes which may occur in any part of the body. In certain tissues, as in the muscles, there is little more than a condition of *arrested* nutrition, productive of wasting; but in other parts, such as the lungs and mucous membrane, there is a state of *perverted* nutrition, leading to peculiar organic changes. By attending locally to the larynx, there may be a disposition to lose sight of the fact that tubercular laryngitis is but a result of the body-disease, so that although the state of the larynx may be improved, the mischief may return at any time, so long as the tuberculous tendency exists; hence the importance of laryngeal phthisis not being treated as a special disease of the throat, but considered as part of the disorder generally known as consumption. As previously stated, without the use of the Laryngoscope laryngeal phthisis, cannot be diagnosed satisfactorily in its very first condition; when further advanced, it is not possible to de-

termine, without this instrument, which of the forms of laryngeal disease may be present, and we merely know there is tuberculous mischief going on in the larynx from the aphonia, or the obstacle in the throat to the admission of air into the lungs, or the pain in the larynx and the difficulty in swallowing, not unfrequently accompanied, in bad cases, with acute pain, referred to the ears, internally. Again, without the use of the Laryngoscope, we may have to witness death from want of nourishment, due to impeded deglutition; while, with the assistance of this instrument, we may either avert this painful termination, or, at all events, check it until the total abeyance of the power of nutrition in the body can turn to no use the food admitted into the stomach.

Before proceeding to the narration of my cases, I may be allowed to add a few words on the treatment of laryngeal phthisis, which, I regret to say, is not near so satisfactory as when we have to deal with ordinary laryngitis unattended with a tuberculous diathesis; indeed, it is very obvious that the tubercular affection of the larynx being merely a symptom of consumption, we cannot expect to cure it unless we begin by arresting the general state of disease; hence a local treatment can do but little more than relieve the tuberculous state of the larynx. The treatment should be directed principally to the general condition of the body—tonics, preparations of iron,* phosphoric

* Where the laryngeal symptoms are acute, there is occasionally some pain felt at the larynx on taking the usual preparations of iron, on account of their astringency: in such cases I am now in the habit of prescribing the soluble colloid oxide of iron, sold by Dinneford, in Bond Street, which is entirely free from taste and astringency. It is conveniently taken in milk.

acid, and cod-liver oil being the principal means within our reach. I have applied solutions of nitrate of silver, ʒij to an ounce, and strong solutions of carbolic acid, to the larynx with a camel-hair brush, without obtaining any marked relief. I have tried astringent solutions, showered into the larynx with the laryngeal syringe and spray-producer, without much benefit. I think croton oil liniment applied freely to the larynx and neck, externally, may do good, from its action as a counter-irritant; but then, the patient must be prepared for some inconvenience from the treatment, as the motion of the head and neck increase the discomfort due to the pustules. I cannot say I have seen much use derived from tincture of iodine applied to the neck. Wearing a charcoal respirator certainly benefits the patient and affords relief, without giving rise to any serious inconvenience. From the irritation of the larynx, which must be occasioned by impure air and particles of dust floating in the air we are constantly breathing in such a town as London, it stands to reason that any means calculated to purify the air respired will act beneficially in the cases under our present consideration. I thought of applying the well-known purifying power of charcoal to that object, both for the relief of pulmonary and laryngeal phthisis, and a number of my consumptive patients have been wearing charcoal respirators, made by Mr. Rooff, of Willow Walk, Kentish Town; they express themselves greatly relieved by their use. The property which charcoal has of absorbing gaseous impurities floating about in the air may be readily shown by the wonderful deodorising power of a layer of this substance, placed in a tray over a jar containing organic matters undergoing putrefaction. It is

difficult to ascertain when a given amount of charcoal will be so far saturated with nephitic gases as to lose its absorbing property. Indeed, this substance has been found to have the power of oxidizing or decomposing gaseous products of decomposition which it condenses within its pores, so that its action is to a certain extent unlimited. Dr. Stenhouse, who has given great attention to the use of charcoal as a disinfectant, observes, in a letter to the Right Honourable the Lord Mayor, published in 1861, that in the case of air-filters, or charcoal ventilators, which were fitted up at the Mansion House and Guildhall, the charcoal did not require renewing after a period of eight years; and, taking advantage of this property of charcoal, he (Dr. Stenhouse) had charcoal respirators constructed; these, however, I regret to say, have never to my knowledge been applied to the treatment of pulmonary diseases; they were certainly not used at the time when I first showed the utility of charcoal for purifying the air breathed by people suffering from pulmonary complaints.* Again, Dr. Letheby observes, in a letter to Dr. Stenhouse, that a charcoal ventilator applied to a sewer, with the object of preventing the escape of sewer gases which had been a source of great annoyance and injury to health, acted most efficiently, and worked as well as ever after a lapse of two years, nothing having been done to it during the whole of that time.

I need not multiply these statements; enough has been said to show the action of charcoal on air made to pass through it, and to satisfy even the most sceptical that this power may continue for a considerable length of time; hence charcoal respirators will not have to be

* *British Medical Journal*, January 23rd, 1869.

refilled, and the charcoal will continue acting until the respirator is fairly worn out. When wet, charcoal does not absorb gases so well as when dry, so that I should consider it advisable to dry a respirator near the fire, from time to time, to rid it of the moisture from the breath.

The action of charcoal as a means of purifying air from particles of dust, or any light substance floating about in the air, is well illustrated in the following case:—

Some years ago, when I was Assistant-Physician to the Westminster Hospital, a chaff-cutter applied to me to be treated for chronic bronchitis of a severe form. He complained of the dust he was constantly breathing while at work, causing much irritation in the chest. It then occurred to me that by wearing a charcoal respirator, my patient might be saved from the obvious cause of his illness. Having procured one of these respirators, made so as to protect both mouth and nose, I went to see the man at work. He was enveloped in a cloud of dust, mostly of the finest description, which was accumulating about the room to a considerable depth. On my standing close to the chaff-cutter, I was actually suffocated by the dust; but, from acquired habit, he could bear it. I then put on the respirator, and was astonished at finding that, in the thickest of the dust, I could breathe as freely and as comfortably as in pure air. The man took to wearing the respirator when chaff-cutting, and often since then gratefully acknowledged the benefit he derived from it.

It is hardly necessary to insist on the importance of protecting diseased lungs and air-passages from solid particles suspended in the air which is breathed. I

need only repeat that, especially in large towns, minute particles of various substances are constantly floating about in the air; and that they must be a constant cause of irritation, from which it is important to protect inflamed or otherwise affected organs of respiration.

A local treatment I have found beneficial in the swollen and indurated form of laryngeal phthisis, is scarification of the parts; for which purpose I am in the habit of using Mackenzie's laryngeal scarifier. The epiglottis may be scarified or punctured without difficulty, two or three punctures being made at one sitting: a small quantity of blood is drawn, which is productive of much relief, the operation being especially beneficial where the act of swallowing is much interfered with. I have also in such cases punctured the arytenoid cartilages and false cords with marked benefit, the amount of blood which trickles from the wounds being too small to depress the body.* I shall at a future page explain the *rationale* of this treatment, which I think quite consistent with the pathology of tubercule.

I have obtained in laryngeal phthisis much relief from the introduction of a solution of iodine in olive oil into the larynx, with a camel-hair brush. Twenty grains of iodine may be dissolved in one ounce of olive oil containing five grains of iodide of potassium, without giving it either a marked taste or smell of iodine. This iodized oil should also be rubbed externally into the skin of the neck over the larynx, and I believe iodine is more quickly absorbed by this means

* When the laryngeal mucous membrane is extensively infiltrated with tubercular deposit, scarification had better, I believe, be withheld.

than by any other form of external application. It may cause a slight degree of cutaneous irritation, and bring on a few small boils, and the skin is sometimes coloured yellow by the use of this liniment; but I have not seen it productive of any objectionable effects. As a proof of the rapid absorption of iodine in the present form, I have observed in one case its irritating action to be felt in the larynx while the oil was being rubbed outside on the neck.

I have also used frictions to the neck with mercurial ointment, and occasionally obtained encouraging results from it; but I should deem it advisable to be careful in the use of any mercurial preparation in phthisis. Finally, the inhalation of iodine is frequently attended with relief to the laryngeal symptoms. For this purpose I am in the habit of prescribing a solution of one and a half grain of iodine in a pint of water, containing a few grains of iodide of potassium; and this is used luke-warm, in a common inhaler, several times a day, so long as it does not increase the pulmonary irritation.

CASES ILLUSTRATING LARYNGEAL PHTHISIS.

I have divided these cases into three classes :—

1st. Those illustrating the first form of the disease, known by the congestion, thickening, and granular appearance of the part, and its white, mucus-like secretion.

2nd. Cases illustrating the second form of laryngeal phthisis, or ulcerations of the larynx.

3rd. Cases illustrating the third form of laryngeal phthisis, known by the occurrence of vegetations on the supra-glottic mucous membrane.

Cases of Tuberculous Thickening of the Larynx.

Case.—Mrs. H., a governess, aged about 30, called on me on the 26th September of last year. Has a daughter nearly eleven years old, who has suffered from cough since birth. There is, however, no hereditary predisposition to phthisis; has not become emaciated, has never suffered from hæmoptisis, menses regular, no dyspnœa; is subject to what she calls sick head-ache, but not to hysteria; was formerly very fond of singing, and considered as having a good voice. About sixteen months previously she began coughing, her voice commenced to fail, and by degrees she had to give up singing altogether; for the last twelve months, except on very few occasions, she has not been able to sing; during this time the cough has continued, becoming gradually worse. At present, she speaks in a tolerably clear voice, but on attempting to sing, the notes are dropped; for the last three or four weeks feels in the larynx a soreness, although no pain on swallowing.

The laryngoscopic examination was difficult at first, from the irritable condition of the pharynx, which I succeeded in overcoming by the application of an ice-bag to the throat. The back of the tongue was in a highly follicular condition, the epiglottis red, the laryngeal mucous membrane (arytenoid cartilages, epiglottidean folds, and false cords) red and swollen; the vocal cords were congested. Phys. signs, 26th September. Right apex in front, breathing slightly harsh, and just a shade of dulness; nothing else.

I applied a solution of nitrate of silver to the larynx with a brush, and prescribed a solution of alum to be

showered into the larynx with the hand-ball spray-producer; to take a mixture of steel and quinine, and cod-liver oil.

October 3rd.—I observed a white, mucus-like exudation oozing out between the arytenoid cartilages; vocal cords losing their glistening appearance. Phys. signs. Right apex in front, crackling, with slight dulness. Appetite bad.

October 14th.—Feels better; no positive crackling now in the right apex, but the dulness continues; can sing a few notes; appetite not improving. The swelling in the larynx appears to have subsided, having left a relaxed condition of the mucous membrane.

October 21st.—A spot about as large as a crown-piece on the right side of the chest, over the second rib, and two inches from mid-sternum, is decidedly dull on percussion; respiratory murmur and crackling to be heard there on auscultation. Mucous rales elsewhere throughout upper part of right side. Left, respiration harsh; temperature in the mouth, under the tongue, 98° 8; weight of body, 8st. 8½ lbs. A blister to be applied to the upper part of the right side, and to take some syrup of phosphate of iron, with half a grain quinine per dose. Omit the spray. It was probable that there had been a process of tubercular deposit going on in the right lung for some time, now beginning to soften with the formation of a cavity. An apparent improvement was taking place at the same time in the state of the larynx, as on the date of the last report she could sing in a feeble voice. I could see, however, distinctly *the white mucous exudation in the larynx*, and the red and relaxed false cords.

October 26th.—Larynx speckled with a white, tuberculous granulation, now very distinct; cannot sing at

Drawing of the larynx of Mr H as seen with the laryngoscope and illustrating the early stage of laryngeal phthisis

all to-day, but no hoarseness of the voice; the softening is going on in the right lung; appetite very bad; night-sweats.

October 31st.—Amphoric breathing at right apex, with but slight crackling. Left, in front, no dulness, but harsh breathing; coughs a good deal; no particular dyspnœa. According to my advice she then left for Torquay. I heard from her a few weeks later that she was not improving.

This case is full of interest: it shows the gradual passage from the earliest or premonitory stage of laryngeal phthisis to the occurrence of what may be called the first stage of laryngeal phthisis, marked by the deposit of tubercular granulation in the larynx, and the secretion of the white mucous substance. The inflammation first observed subsided under treatment, but subsequently, as the disease of the lungs progressed, it assumed the distinct character of tubercular phthisis; there were no ulcerations in the larynx when the patient left town, but her voice was becoming gradually weaker, showing an increased weakness in the action of the vocal cords.*

Case.—John H., aged 43, first called on me at the Hospital for Consumption, on the 27th June, 1868. A clerk, but has done no work for some time; is tall, but sparingly built, with prominent cheek-bones. He lost his voice gradually, and in October, 1867, could only speak in a whisper. The affection began with a sore throat, which lasted for three months,

* Mrs. H. called on me on May 3, 1869; her general health was tolerably good, but the pulmonary disease was progressing slowly. The larynx was much in the same state as when she left for Torquay, showing a remarkable chronicity of the laryngeal affection. Voice good.

previous to the aphonia becoming complete. About May, 1866, had an attack of pleurisy, from which he recovered perfectly. Slight hæmoptisis once or twice in March, 1868. Father and mother both died young from phthisis. Voice lost up to the present time; now speaks in a whisper; complains of pain in the throat, much increased in the act of swallowing, and his food is almost all liquid. Has a cough.

With the Laryngoscope the follicules of the back of the tongue are seen red and enlarged, the epiglottis is thickened and clearly observed to be studded over with a granulation of a tubercular aspect. This is mostly visible on the thickened upper rim of the epiglottis. The mucous membrane of the larynx is much swollen on both sides, but still leaving a fair passage for the admission of air into the lungs. July 23rd. Has been gradually recovering his voice, some words, however, dropped now and then. A white secretion is forming on the laryngeal mucous membrane, which is less swollen; the epiglottis is also less thickened. No pain in throat; cough continues. Temperature under tongue, 99° 2. August 4th. Voice not so good; rather more swelling in the larynx; the vocal cords are very narrow and rudimentary; moreover, the swollen arytenoid cartilages being unable to approach each other sufficiently, the cords cannot be made to meet on his attempts at phonation.

Phys. signs. Left side of chest flattened, expansion of right side fuller than that of left. No dulness. Respiration vesicular and normal, with prolonged expiration at apices in front and behind; at left base, however, respiratory murmur deficient, with indistinct harshness. He informs me this was the part which had been affected with pleurisy..

Drawing of the larynx of John H. as seen with the laryngoscope and illustrating the thickened form of laryngeal phthisis with a granular condition of the larynx.

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The result of the treatment, so far, was tolerably satisfactory. Inhalations of iodine, with counter-irritation applied to the throat in the form of blisters, had relieved him most. A solution of nitrate of silver, ʒij to the ounce, frequently applied to the larynx with a brush, had not been attended with any marked benefit. He had taken cod-liver oil and a mixture of syrup of phosphate of iron with quinine. Weight of his body, July 9—8 st. 6½ lbs.; July 17—8 st. 5¼ lbs. I saw nothing of this patient till October 2nd, up to which time he had continued taking the mixture of phosphoric acid, iron and quinine, and cod-liver oil. On that day he had improved greatly in flesh and in strength, having increased in weight by 4¼ lbs. Temperature under tongue 97° 9. On the left side of the chest respiratory murmur deficient, but vesicular; and harsh on the right; no dulness in front. Voice a mere whisper. There had been obviously up to that time no clear and reliable signs of pulmonary tubercles. With the Laryngoscope, the mucous membrane of the larynx is observed to be universally thickened and relaxed; no vocal cords can be seen, but the larynx appears funnel-shaped, contracting at the glottis. The epiglottis is still thickened, but less so than previously.

October 7th.—Could speak about twenty words since last called, after inhaling the vapour of iodine.

October 14th.—With the object of improving the strength of the muscles of the cords, I applied galvanism to them, producing muscular spasms of the larynx, which continued for about a minute after the removal of the galvaniser from the throat.

October 16th.—Voice returned for a minute or two last night and night before. The epiglottis is now considerably reduced in size, but is still speckled with

tubercular granulation. Says that on the evening of the 14th he coughed up two solid bodies like clots of blood and about the size of a shilling, after which he felt his throat much relieved. Coughs rather more the last few days. Again applied galvanism to the larynx.

October 26th.—Voice improving; when conversing, words occasionally break out in a low key. Galvanism has been applied several times since last report; is again galvanised to-day.

November 2nd.—Phys. signs. Left, at a spot under second rib and near sternum, no respiration heard; some metallic crackling, but no dulness. At the base, some dulness and deficient respiration. At right apex in front, bronchial breathing, and behind some crackling. I gave him a charcoal respirator to wear. Weight of body 8 st. 11¾ lbs.

November 6th.—Speaks in a very rough deep tone of voice, dropping some of his words; the cough increasing. There has been no change in the medicine; is applying croton-oil liniment to the chest.

November 9th.—Less cough, and feels the better for the charcoal respirator. I again apply galvanism to larynx.

November 13th.—A fair voice, but still rough, and in a low, uniform pitch. Some rather violent spasms of the throat, brought on by the application of a solution of nitrate of silver, 80 grains to the ounce, to the larynx. I again apply galvanism.

November 20th.—Tone of speech is D, third below the leger-line. Weight, 8 st. 12¼ lbs., showing a regular increase, notwithstanding the progress of the pulmonary symptoms. Appetite now very much better. To omit the medicines, and take liquor arsenicalis,

ɱ. v., and carbonate of potash, grs. x, in water three times a day.

December 11th.—Phys. signs. At left apex, in front, dulness on percussion and cavernous blowing there, but lower down respiration tolerably free. Right side in front, deficient respiration and blowing at apex, with friction sounds.

January 22nd, 1869.—Voice now very tolerably good; some slight intonation; is much pleased with the improvement.

April 9th.—Continues tolerably well, with a pretty good, but harsh and uniform sound of voice. Physical signs of chronic third stage of phthisis in both lungs. On the 19th of March was weighing 9 st. $\frac{1}{2}$ lb., having increased by 8 lbs. since he first came under my treatment.*

Remarks.—This case appears to me of interest as showing:—

1st. That the deposit of the so-called tuberculous matter in the epiglottis and larynx may occur before the outset of any positive evidence of the pulmonary disease.

2nd. That the condition of the larynx, and general state and health may be much improved by treatment, although the tubercular disease should be slowly affecting the pulmonary tissue.

3rd. That in cases of chronic thickening of the mucous membrane of the larynx, from tubercular disease, total aphonia, or a mere weakness of the voice, may be due partly to a want of nervous power of the muscles of the cords, which may be overcome to some extent by the application of galvanism to the larynx.

* June 2.—In the beginning of May this patient had a relapse, the swelling of the epiglottis having returned; he is, however, rapidly recovering from it.

Independently of the laryngeal disease, this is a very interesting case of pulmonary phthisis, observed from the very beginning to run through the first stage of tubercular deposit, then through that of softening with the formation of cavities.

Case of Phthisis with Cracked Voice.

This case is one of much interest, as it illustrates, to some extent, the process of falsetto singing as observed with respect to the Tyrolese singer mentioned in the preliminary remarks to this Essay. Moreover, the patient exhibited his larynx extremely well, allowing me to make the most complete and correct Laryngoscopic examination at every sitting.

March 19th, 1869.—John F., age 21, an outpatient of the Consumption Hospital, has been subject to aphonia on and off for the last two months. His speech is now delivered in a cracked tone of voice which he cannot modulate, and some words are dropped into a whisper; he complains of a cough, which commenced about a year ago, and has continued ever since; never suffered from hæmoptisis; a brother died of consumption.

I observed, with the Laryngoscope, the posterior halves of the vocal cords to have lost their lustre, and acquired a red glistening appearance. The cords approximated well, but failed to stretch properly, as shown by the middle of the chink between them remaining open when a sound was attempted, while the ends of the cords came into mutual contact. The arytenoid cartilages were distinctly seen, and their movements could be investigated with perfect ease. In the act of phonation, these cartilages are observed to be drawn anteriorly, and

to approximate so close to each other as to meet, or very nearly so, both cords being at the same time much shortened. When abducted, the cords do not move quite symmetrically, the left assuming more of a diagonal position than the right. The supra-glottic region is red and relaxed, and the cords appear uneven. The fauces are swollen and relaxed.

Phys. signs: At right apex in front, a shade of dulness; cavernous respiration, with crackling to third rib; at base, respiration vesicular, with some crepitation. On that side, posteriorly, unmistakeable signs of cavity and consolidation. The left lung tolerably healthy.

The diagnosis was attended with no difficulty, the case being obviously one of pulmonary phthisis, in the third stage, attended with incipient mischief in the larynx, and partial aphonia from weakness of the tensor muscles of the vocal cords.

The treatment consisted of cod-liver oil, syrup of phosphate of iron with quinine, and croton-oil liniment rubbed occasionally on the right side of the chest, which had been commenced two months previous to my taking these notes. On the 20th March I galvanized his vocal cords for the first time.

March 22nd.—After applying galvanism, the chink between the vocal cords was seen to close during attempts at phonation, and the voice was permanent. I galvanized each cord alternately, which could be done quite easily with the aid of the oxy-hydrogen light; the patient keeping his pharynx and laryngeal passage wide open.

March 24th.—Cords quite symmetrical, voice husky, but stronger, and very few words dropped; says his friends have observed a great improvement in his voice.

Galvanism is repeated, and iodized oil applied to the larynx.

April 5th.—Voice improving. I observe to-day that when the patient is silent the right cord is partly adducted towards the median line, whilst the left remains abducted on the left side of the glottis; in the act of phonation they both meet, but a little to the left of the median line. After applying iodized oil to the larynx the free motion of the left cord was restored, and both cords now met in the median line on the patient wishing to produce a sound.

April 26th.—Cords meet quite well in the antero-posterior axis of the larynx, voice very fair, and can sing a few notes of the scale; but, after being galvanized, can sing all the notes of the scale, although the last two show a tendency to be dropped. I again notice that his arytenoid cartilages are drawn up in the act of phonation, and come in contact with each other, the glottis becoming thereby shortened. These conditions, it may be remembered, are not unlike those that occurred in the case of the Tyrolese singer (although in that instance the power of tension of the cords was normal), and account for the abnormal sound of this man's voice, which, however, has considerably improved.

May 10th.—The supra-glottic region is red; the tension of the vocal cords is still deficient, and they are shortened by one-quarter or one-third of their length in the act of phonation. Voice, however, improving.

Since then the case progressed very satisfactorily. On June 16th both vocal cords moved freely and symmetrically in the act of phonation, &c.; *there was no shortening of the cords*, and they came tolerably well in contact throughout their whole length, showing a

marked improvement in their power of tension. The arytenoid cartilages were no longer displaced in an anterior direction, and their lateral movement was quite free. The patient could sing the scale without any difficulty, and the sound of his voice was much improved. I saw him next on the 8th July, when his voice might have been considered quite natural.

On Friday, the 11th December, 1868, I first saw John B., age 25, an out-patient of the Consumption Hospital, exhibiting most urgent laryngeal symptoms. He had hæmoptisis two months previously, when he first fell ill; before that time had enjoyed good health, indeed says he does not recollect being laid up a single day previous to the present illness, and was never subject to coughing. His paternal uncle, and one of his uncle's daughters, died from phthisis.

He lost his voice about eleven months ago, while in other respects in the enjoyment of good health, and for about three weeks has experienced some difficulty and pain in swallowing, which have gradually increased to such an extent that deglutition is now entirely prevented, and since last Monday, or for about four days, he says he has not taken a particle of solid or liquid food; the poor fellow is actually starving, complaining especially of intense thirst. I tried to make him swallow a little milk, which reached the posterior pharynx, but would not pass the larynx, although the act of deglutition was performed. Immediately after this attempt at swallowing it was obvious that some of the milk had gone into the larynx, as violent coughing was induced, with retching, as if to expel a foreign body from the wind-pipe; and this was followed by most distressing laryngeal spasms; none of the milk had reached the stomach, being

entirely rejected. I proceeded at once to a laryngoscopic examination, and obtained a good view of the larynx. The arytenoid cartilages and epiglottidean folds were very much enlarged, the swelling extending from the posterior part of the larynx to the epiglottis on both sides; the thickened mucous membrane was covered with a layer of a white tenacious fluid; between the margins of the swollen parts and the epiglottis anteriorly there was a free space, large enough to admit air into the lungs without straining of the muscles of respiration; nothing could be seen beyond the swollen arytenoid cartilages and epiglottidean folds, and the state of the cords could not be determined, but there appeared to be no ulceration. I applied a solution of nitrate of silver, ʒij to the ounce, to the larynx, but without improving the deglutition, and at once came to the conclusion that the only thing to be done was to scarify the swelling, with the object of letting out matter, if any was present, or relieving the vascular tension of the part by drawing a little blood. Fearing, however, that in the state of weakness of the patient, loss of blood might be serious, I called on my neighbour, Dr. Buchanan, and requested him to be so kind as to give me his opinion as to what was best to do; he very kindly saw the patient, and we decided that no other means but scarification of the larynx would be likely to give immediate relief, and enable some food to be swallowed. I therefore proceeded to scarify the swollen mucous membrane of the arytenoid cartilages, which I did in several places, and without any difficulty, the patient keeping his pharynx very quiet. A small quantity of blood was seen trickling over the swollen parts, but altogether it could not amount to more than a few

drops. A few minutes later I gave the patient, in a teaspoon, some milk mixed with a little sherry—this he swallowed without much difficulty; after having taken a few more teaspoonfuls of the milk, a hot linseed-meal poultice was applied to his throat, and he was allowed to rest on a couch for about a quarter of an hour, when I gave him more milk and sherry, which he now swallowed from a teaspoon tolerably well, the quantity thus taken amounting altogether to about half a tumbler. No very careful examination of the chest could be made on that occasion; but the state of the larynx needed but little further confirmation as to the tubercular condition of the lungs; the percussion note was obviously dull on the left side of the thorax. I directed him to take a teaspoonful of cod-liver oil three times daily, and his food to consist of milk and a little sherry, with beef-tea, and a little finely minced meat, if it could be swallowed. He was then taken home in a cab much relieved.

On the 19th December I examined the patient's chest. On the left side, above the nipple, respiration very deficient, with crepitation, blowing expiration at both apices. Posteriorly, respiration tolerably good; pulse 132; small, but not soft. His treatment now consists of cod-liver oil, and six grains of bromide of potassium, taken three times a day in solution in water. Can now swallow tolerably well. I again scarify the larynx.

December 21st.—Deglutition not quite so free, and more painful; the epiglottis, which had not yet been affected, now beginning to swell. I apply to his larynx, with a camel-hair brush, a solution of ten grains of iodine in an ounce of olive oil, which produces great relief. Takes a fair amount of food, mostly consist-

ing of milk and mutton-broth, both thickened with bread.

On the 23rd December, in addition to the cod-liver oil and bromide of potassium, I prescribed for him some of the soluble colloid oxide of iron (French preparation), which I thought he could swallow without inconvenience, being tasteless and free from astringency.

Two or three days after Christmas, his health was giving way, and I advised his removal from an unhealthy spot in Vauxhall, where he was living, to a lodging near my house, where he would breathe better air, and be within easy reach of my residence; this was done on the 2nd January. On January 8th, there was a favourable change, which, however, proved but temporary; he then commenced losing his strength rapidly, keeping all day to his bed; his features became sunken; the pain in the throat again increased, notwithstanding frequent applications of iodized oil to the larynx, frictions to the neck with the same material, and poultices to the right side of the neck, where he suffered most.

January 20th.—Hearing that he had suffered from a chancre five years previously, although the disease of the larynx was clearly tuberculous I prescribed mercurial ointment to be rubbed to his throat, and five grains of iodide of potassium to be taken three times a day. This treatment was followed by an improvement of the deglutition, and three days later he could swallow with but very little pain.

On the 25th January he was decidedly sinking; he had taken no food the day before, as much from weakness as from any impediment in the act of deglutition. On examination with the Laryngoscope, I

observed a tumour of a conical shape growing on the right arytenoid cartilage, and, apparently, in a great measure concealed by the thickened right epiglottidean fold. The supra-glottic region was covered with a thick, white secretion, under which the mucous membrane appeared to be undergoing an extensive and rapid softening. Vomited a large size ascaris lumbricoides the day before. He died that evening; leave could not be obtained for a *post-mortem* examination. The last time the physical signs of the chest were inquired into was on the 12th January; when on the left side there was loud, dry, cavernous breathing in front, with occasional click; the dulness had been replaced by excessive resonance. On the right side, in front, some cavernous breathing, with crackling. Some vesicular breathing on the left side, posteriorly, and on the right, in front.

Remarks.—This was obviously a clear case of tubercle, and not of syphilis, and had I found out sooner that the patient had suffered from a chancre, I doubt whether a mercurial treatment would have been of any use; the mischief in the lungs increased *pari passu* with that of the larynx. The scarifications were very effectual in lessening the acute laryngeal symptoms, and improving the power of swallowing. The treatment adopted was, in other respects, productive of much relief, and probably prolonged life for about two months.

I shall only relate one more case of this class of laryngeal phthisis, which was also greatly relieved by direct treatment applied to the larynx.

January 23rd, 1869.—James L., age 22, a bookbinder, out-patient of the Consumption Hospital, Brompton, has no voice, and speaks in a whisper since the end of August last, or for about five months; this affection came on gradually, having commenced

with hoarseness, which lasted for three months before he lost the power of uttering sounds. He had noticed his voice to be hoarse two years ago, when he was seized with hæmoptisis, since then it never was so clear as before; he could, however, continue to sing till last May.

He had an attack of inflammation of the lungs when about six years old. A brother of his died from some pulmonary affection. Father, mother, and rest of the family in good health. Since he suffered from hæmoptisis, two years ago, has had a cough, accompanied with expectoration.

The examination of his chest shows the existence of caverns in both lungs, with some degree of softening. With the Laryngoscope, his epiglottis was observed to be pendulous, much thickened with tubercular matter, and notched at its upper margin. The larynx could not be seen, but a white mucous secretion was observed oozing out from between and over the arytenoid cartilages. The back of the tongue was very red and follicular. Suffers much pain in the act of swallowing, and occasionally feels as if suffocated when lying down at night. Can walk two miles without fatigue, and could do a day's work a fortnight ago. Pulse, 118. Has decreased in weight from 9 st. 4 lbs. to 8 st. 7¼ lbs. during the last few months. Solution of iodine in oil was applied to the larynx; and he was directed to inhale the vapour of iodine, and to take three grains of iodide of potassium three times a day and cod-liver oil.

January 25th.—I puncture the epiglottis in three places, and let out a few drops of blood. This relieved the swallowing considerably.

January 27th.—Less redness of epiglottis, which is not so much swollen, but very granulous; deglutition

much improved. Scarifications were repeated. Is increasing in weight (8 st. 8¼ lbs.) but not in strength. Temperature in mouth, 99° 6.

January 30th.—Epiglottis becoming very hard, as ascertained in the act of puncturing it; has been wearing, according to my advice, a charcoal respirator, which he finds to relieve the cough very much. Is rubbing his neck freely with a solution of 20 grains of iodine in an ounce of olive oil.

February 2nd.—Epiglottis punctured in three different places with the scarifier, but little blood can be obtained.

February 10th.—Scarification repeated; epiglottis becoming paler and harder.

February 15th.—Epiglottis was again scarified. Deglutition fair, though performed with a little trouble, and he thinks it is perhaps not quite so easy. Condition of the chest much the same, but has increased in weight by two pounds (8 st. 9¼ lbs.) since first attended. Pulse, 104; temperature in mouth, 99° 1. A mixture containing iron to be taken instead of the iodide of potassium.

February 19th.—Weighs 8 st. 10 lbs.; the epiglottis becoming paler and harder; very little blood to be obtained by scarification. Swallowing much the same; pulse, 118.

April 10th.—Has been an in-patient in the Victoria Park Hospital, which he left but three days ago. The softening and formation of cavities has been going on in the lungs; the left side of the chest, which had been dull, now emits a metallic sound on percussion. With the Laryngoscope the epiglottis is seen to have altered in shape, being now contracted, contorted, or twisted, and otherwise out of shape, without, however, exhibit-

ing any distinct tuberculous granulation. Swallowing tolerably free, and much easier than when he first applied to me. The epiglottidean folds and arytenoid cartilages are seen covered with white exudation; no deep view of the supra-glottic region can be had on account of the pendant epiglottis. Iodized oil is applied to the larynx, and to take syrup of iodide of iron, ʒi, three times a day.

April 24th.—Not doing so well; about half the epiglottis entirely softened away; supra-glottic region, now better seen than formerly, is covered with white secretion, and appears to be undergoing softening. Opening of the glottis considerably narrowed, apparently by thickening of false cords, and feels as two balls on each side of the throat, preventing the ingress and egress of air. Expectorates a great deal; deglutition again difficult, and can only swallow such food as milk or beef-tea thickened with bread. The rush of air through the glottis causes acute pain, mostly felt inside the ears. He died on the 10th of May, but the deglutition continued tolerably good, and he was never in want of food from inability to swallow.

Remarks.—This case is not unlike that which immediately precedes it, and none but a very unfavourable prognosis could ever be given. It is questionable whether the softening of the epiglottis was hastened by the punctures; at all events the scarifications were productive of much relief at the time; and the main cause of the laryngeal suffering, the last few days of the patient's life, was not due to the condition of the epiglottis, but to the swelling and induration of the supra-glottic region. The tubercular diathesis was strongly marked, and the diseased condition of the lungs made rapid progress.

Cases of Ulceration of the Larynx, illustrating the Second Form of Laryngeal Phthisis.

It is impossible to diagnose the presence of ulceration in the larynx without the use of the Laryngoscope; no other sign may be exhibited but aphonia. The patient is likely not to complain of pain on swallowing, or of any mechanical obstacle in the throat to the act of breathing. Hence, without an examination of the larynx, the disease may be mistaken for a weakened condition of the muscles of the cords, as occurs in hysteria, or for a merely swollen or relaxed state of the laryngeal passage. Of course the result from an examination of the chest will awaken suspicion, but laryngeal ulcerations do not, I should say, as a rule, accompany the early stage of pulmonary phthisis. I believe they are more frequently associated with the second and third chronic stage of the pulmonary disease attended with softening and the formation of cavities. There are exceptions, however, and I shall have one case to relate in which none but the closest inquiry into the physical signs of the chest could elicit any symptom of phthisis; indeed, the excellent general health of this patient, and the well-nourished condition of his body was far from suggesting the presence of tuberculous disease.

Case.—A. B., age about 25, applied to me at the Consumption Hospital on the 4th July of last year. He speaks in a whisper, his voice having become gradually weaker for the previous fortnight or three weeks. It had, however, been obviously failing for some time, as just after Easter he had suffered, for about three weeks, from a first attack of aphonia, and had been in other respects much subject to hoarseness.

With the Laryngoscope the epiglottis is seen streaked with enlarged capillaries, and the mucous membrane of the larynx appears red, though not swollen. On attempts at phonation, none but rudiments of cords can be seen, and by making a considerable effort, can, just for a second or two, utter a sound in a low tone of voice. On the 10th July a repeated examination of the larynx showed a jagged condition of the cords, and the presence of a small superficial ulceration on the right false cord. On percussion and auscultation of the chest (in front) no dulness; bronchial respiration on both sides, and some harsh breathing, mostly on the left; expectorations tinged with blood on one or two occasions. On the 13th July, after applying a solution of nitrate of silver to the larynx, and passing a stiff galvanic current between the back of his tongue and the thyroid cartilage externally, he could speak a few words in a fair voice, although with some difficulty.

July 24th.—Can say whole sentences with some trouble, and then relapses into a whisper. I obtained a good view of the larynx. When he says Ah! the cords are seen to come in contact, but on phonation ceasing, the left immediately disappears, while the right remains *in situ,* showing obviously a weakness in the abductor muscle of the right cord.

October 8th.—I lost sight of this patient from the end of July till the present date, when the epiglottidean folds were observed to be much swollen, and to be secreting a white mucus. There are two ulcerations in the posterior wall of the larynx, one on the right side, involving the right true vocal cord; the other on the left, unconnected with the left cord. The cords move toward each other freely on attempts at phonation, but have no power of tension. Is at present an in-

Drawing of the larynx of A. Brasiliensis with the laryngoscope and illustrating laryngeal ulceration.

patient in the Consumption Hospital. October 30th.—Phys. signs: In front, respiratory murmur very fair throughout. Left base, low friction sounds, bronchial breathing. Notwithstanding these uncertain physical signs, he has lately suffered from hæmoptisis.

Nov. 4th.—For the last few days has been applying to his larynx, with the spray-producer, a solution of 5 grains of tannin per ounce of water; can speak a few words aloud; this morning the ulcerations have rather a more healthy appearance.

Nov. 12th.—I observe to-day a fresh ulceration on the left side of the larynx anteriorily, just under the epiglottis; the others have a tendency to spread, and become deeper. Looks depressed; some diarrhœa.

Nov. 19th.—Phys. signs: Left side in front, distinct cavernous breathing, although respiration vesicular immediately under the ear; no dulness; amphoric vocal resonance. Posteriorly left: respiration vesicular, though harsh; no dulness. Right side in front, respiratory murmur loud, bronchial, and harsh; posteriorly, dulness and dry cavernous respiration, with distinct cavernous resonance of the voice. Diarrhœa continues; applies for a certificate for the Eastbourne Convalescent Institution.

This patient was treated with applications of solutions of nitrate of silver and tannin to the larynx with a camel-hair brush, and on the 30th Oct. commenced frictions (once a day) with strong mercurial ointment, on the thyroid cartilage. Internally he took cod-liver oil and syrup of iodide of iron.

Remarks.—This case shows the difficulty of treating successfully laryngeal ulcerations in phthisis, and the fact that the laryngeal complication increases *pari passu* with the mischief in the lungs. I followed up carefully

the changes taking place in the chest, and observed the sudden occurrence of condensation of pulmonary tissue and formation of cavities, together with the appearance of a fresh ulceration in the larynx, and the setting in of diarrhœa, which might have resulted from ulcerations commencing in the intestines.

It must not be hastily concluded that frictions with mercurial ointment are contra-indicated in cases of this kind.

H. M., age 44, employed as a reader in a newspaper office, consulted me at the Consumption Hospital, in the beginning of October, 1868. He had lost his voice eight or nine years before in consequence, he says, of having his clothes wet. After four months it returned suddenly. In the following winter he lost his voice afresh during the cold weather, and it again returned spontaneously in the summer. For the following three or four years there was no relapse of the aphonia. However, three years ago his voice again completely failed, and since then it has not returned. Never had syphilis. Is subject to a cough. Has not suffered from hæmoptisis, or from any attack of inflammation of the lungs. Lost a maternal aunt and uncle from phthisis; but both father and mother now living, and in good health. Never felt any pain in the throat till last February, when he observed he could not swallow as freely as usual. Dr. C. T. Williams, who first saw this patient, directed him to apply a blister to the throat, which relieved the painful deglutition, but without inducing any return of the voice.

At present his general state of health is fair; indeed, he says he has much improved, and is gaining strength. The sound of his cough is such as to show that the larynx cannot be closed at the time.

With the Laryngoscope, the laryngeal cavity is observed to be much contracted from thickening of its mucous membrane; none but rudiments of vocal cords can be seen, and posteriorly each of them is the seat of an extensive and deep ulceration. Phys. signs: In front, left and right, percussion note quite clear, although perhaps a shade duller on the right side; posteriorly right, percussion note also a shade duller than on the corresponding left side. Respiratory murmur fair on both sides in front, although on the right it is rather bronchial and slightly harsh. Posteriorly, vesicular murmur not quite so loud on the right as on the left side.

The treatment which was adopted consisted in the internal use of iodide of potassium, and, subsequently, liquor arsenicalis in doses of ♏ij ss, together with cod-liver oil. Externally, croton-oil liniment, afterwards mercurial ointment; and finally, a solution of iodine in oil, frequently rubbed on the throat. Various solutions were applied locally to the larynx. Carbolic acid shaken up with water, in the proportion of one to rather more than six, applied with a camel-hair brush, was followed with a return of the voice, though only for a word or two. He inhaled iodine; and a shower on the larynx of five grains of tannin to one ounce of water acted beneficially; his vocal cords were also galvanized. On November 2nd the power of phonation was returning, for a few hours at a time. About the end of December his voice had settled into a low, harsh sound, decidedly above a whisper, probably due in some measure to contraction of the false cords. General health excellent, notwithstanding the nature of his work, which is carried on at night, from ten to four A.M.; his appearance is that of a man in good health.

However, on the 18th January, the physical signs of the chest lead to a strong presumption of pulmonary mischief; these were:—left side in front, deficient and very harsh respiration, with indistinct mucous rales; right, respiratory murmur deficient throughout, and harsh at apex, with slight vocal resonance there; *posteriorly*, right side, distinct dulness, compared with percussion-note of opposite side; respiration very deficient, and harsh both sides, especially on the right, with indistinct crepitation in right supra-spinous fossa. April 30th.—He has derived benefit from wearing, as much as possible, a charcoal respirator when at work, to protect his throat and chest from the unhealthy products of combustion of gas prevailing, at times, in his office. In the middle of February I examined his larynx, when the ulcerations exhibited much the same appearance as before, and the epiglottidean folds, especially the left, were much swollen. His voice is now between a low, hoarse sound and a loud, harsh whisper. His general health keeps good.

From the physical signs of the chest in the present case the existence of tubercular mischief in the lungs is highly probable, although not certain.

Tubercular Vegetations in the Larynx, or Third Form of Laryngeal Phthisis.

I have now seen four or five cases of this variety of laryngeal phthisis. The vegetations were invariably accompanied with unmistakable signs of pulmonary tubercles, usually in the second and third stage; hence they must be considered as a tuberculous disease. They may be attended with no pain, or produce no difficulty in the act of swallowing, and they are not invariably, as

appears to be the case with tubercular ulcerations of the larynx, productive of aphonia. The loss of voice from this affection appears due merely to the mechanical action of a foreign body between the vocal cords, or to the thickening of the mucous membrane on the posterior part of the larynx, preventing the approximation of the arytenoid cartilages. In the case of laryngeal ulcerations, the aphonia which occurs, I should say, in an early state of the disease may be considered as owing in a great measure to a weakness in the action of the muscles of the cord, as I have seen loss of voice in instances where the ulcerations were unconnected with the vocal cords, and when there was apparently no mechanical obstacle sufficient to account for a total suppression of the voice.

This affection, like other forms of tubercular disease of the larynx, as a rule keeps pace with the state of the lungs. I have, moreover, observed patients thus affected to be liable to attacks of diarrhœa; but I think, as previously stated, that these laryngeal vegetations may disappear, leaving no more but an indurated and raised patch of mucous membrane. I have treated these cases with such solutions as nitrate of silver and chromic acid, applied with a camel-hair brush, and have obtained good results from the topical application of iodized oil to the part; the throat may also be rubbed externally with the same substance. Of course this treatment is exclusive of the means adopted towards the general treatment of the disease.

Case. — Sarah W., age 22, consulted me at the Consumption Hospital, in the beginning of November, 1868. For the last three months speaks in a whisper, though occasionally the voice returns with a hoarse tone. She feels as if there was something in the throat

(larynx) to remove. On examination with the Laryngoscope, the posterior part of the larynx is seen covered with thick mucus; this is dislodged by coughing, leaving a pale, raised, and irregularly thickened patch of mucous membrane; the cords are quite healthy. After applying a solution of nitrate of silver to the larynx (℈ij to ʒj) the voice returned, with a fair tone.

The physical signs show the presence of a cavity, with softening in the right lung.

November 9th.—Voice decidedly improved. Can see distinctly the raised patch on the posterior part of the larynx. Is taking phosphate of iron with quinine, cod-liver oil, and a cough mixture. I supply her with a charcoal respirator.

November 16th.—Vegetations have formed on the raised patch in the larynx. She thinks she has taken cold afresh, and coughs more; diarrhœa has set in. I apply carbolic acid (one part to six of water) to the larynx, with a camel-hair brush. The iron and quinine medicine to be omitted, and to take one containing bismuth and laudanum instead.

Nov. 27th.—Less diarrhœa. The voice, on the whole improved, but drops a word occasionally. Laryngeal growths decreasing. I again apply carbolic acid; thinks she derives benefit from the charcoal respirator.

December 4th.—Voice again improving. Is gaining weight; two or three loose stools daily.

December 14.—There is evidently a large cavity at the apex of right lung, which appears, however, to be contracting. Some apparent softening at left apex. Slowly increasing in weight. Pulse rapid: temperature under tongue 103° 2. Voice not quite so strong. No improvement in the state of the larynx; the vegetations still present, looking like spiculæ, and preventing

the mutual approximation of the arytenoid cartilages to a sufficient extent for the purpose of phonation.

Remarks.—During the five or six weeks I saw this patient, the disease in the lungs may be considered as having continued, rather increasing. The state of the larynx became more urgent. The quick pulse and high temperature, together with the physical signs, showed the occurrence of active tubercular disease in the lungs, and the larnyx participated in this morbid action. The coincidence of the laryngeal vegetations and diarrhœa may be noticed.

November 6th, 1868.—Edward B., aged 21, has been subject for some months to a peculiar unnatural sound in his voice, which gradually increased, and a week before I saw him he could only speak in a whisper. There has been some difficulty in the act of swallowing. Phys. signs: On the left side of the chest, from apex to nipple, cavernous respiration and metallic crackling; dulness throughout in front. Right side at apex in front, some crepitation; otherwise respiration fair and percussion clear. Has a cough and some dyspnœa. The lungs may be considered as having become affected about March, 1867, when he first fell ill. Two of his sisters died of consumption. Present weight of body, 7st. 9lbs.

With the Laryngoscope a raised patch is discovered on the posterior part of the larynx, on which are seen a number of warty vegetations. To take cod-liver oil and syrup of phosphate of iron with quinine; apply croton-oil liniment to the chest, and use a charcoal respirator.

November 14th.—Voice breaks out at times; health, on the whole, improving, and has gained two pounds in weight (7 st. 11 lbs.).

November 21st.—Improvement continues; voice decidedly better. I apply to the larynx a solution of nitrate of silver.

December 4th.—Voice, on the whole, improved, but has been losing weight (7 st. 9¼ lbs.), and some slight falling off in general state of health. Omit the syrup, and to take liq. arsenicalis, ♏iij, in an alkaline mixture three times a day.

December 11th.—Is taking no cod-liver oil, and has had about eight doses of the arsenical mixture. Weight of body again increased to 7 st. 11¼ lbs.

December 30th.—Expresses himself very much better; can speak now very fairly, though hoarse. None of the thick white secretion to be seen on the larynx, but the vegetations do not appear to undergo any change. I apply iodized oil (gr. xx. to 1 oz.) to the larynx, and neck to be rubbed with this solution several times a day. Less cough and expectoration.

January 6th.—Voice very fair indeed; hoarseness slight; the vegetations have a tendency to decrease.

January 15th.—Vegetations nearly disappeared, and but little more than a raised patch of indurated mucous membrane on the posterior part of the larynx. Voice now good, though still rather hoarse, and even can shout. Complains of diarrhœa. Weight of body, 7 st. 7¼ lbs. Omit the arsenical medicine, and take a mixture of bismuth and "Tr. Opii." A few days later his weight had fallen to 7 st. 6¼ lbs. The diarrhœa continued. Voice and throat much the same. To take a mixture containing dilute sulphuric acid instead of the bismuth and Tr. Opii.

February 15th.—The vegetations have increased afresh, but voice keeps tolerably good. The diarrhœa, which had been checked, again set in yesterday. Weight,

7 st. 5¾ lbs. Tr. Opii, ♏iij per dose, to be added to the acid mixture; to take some iron and quinine, and cod-liver oil.

February 19th.—Diarrhœa stopped; again feels much better; the growths in the larynx are decreasing. I apply a solution of nitrate of silver to the larynx.

On the 19th March, as he continued losing weight, he was directed to resume the arsenical mixture. He weighed 7 st. 4¼ lbs. on March the 12th, and 7 st. 3½ lbs. on April the 5th, showing clearly that, so far, arsenic, which had formerly appeared, in the present case, to promote the power of nutrition of the body, no longer exerted the same action; but when given together with cod-liver oil, the result was different. On the last-mentioned date half an ounce of cod-liver oil was prescribed, to be taken three times a day in addition to the arsenical mixture, and nine days afterwards—on the 14th April—the patient weighed 7 st. 6¾ lbs., showing an increase of weight of no less than three pounds and a quarter within that short time.

Apparently in consequence of the topical application of a solution of chromic acid, and later of one of nitrate of silver to the larynx, the vegetations diminished very much in size, and on the 26th of April there was not much more left than the raised and thickened patch of mucous membrane on the posterior wall of the larynx; nothing but rudiments of the former vegetations now being seen. The left vocal cord is becoming reduced in substance at its posterior half; both of them are well *adducted*, but deficient in *tension;* they have lost much of their lustre. Voice not quite so strong, and a word dropped occasionally. Feels weaker; appetite indifferent.

Remarks.—At first the state of the larynx improved, as the general state of health got better, and this improvement certainly appears due to the arsenical mixture. Diarrhœa, however, set in, and the treatment had to be interrupted. It is difficult to ascribe the bowel-complaint to the arsenic taken in such very small doses; and it is worth noticing that again, in the present case of tubercular laryngeal vegetation, the patient should have been subject to diarrhœa. The looseness was immediately accompanied with a falling off in the man's health. On this being stopped there was a short temporary improvement, but the tubercular disease progressed, and on the 26th April, the last time I saw him before these pages were sent to press, his general health was again falling off. In spite of this circumstance, the local treatment to the larynx frequently applied, had, in a great measure, succeeded in removing the warty vegetations.

At the request of my colleague, Dr. Powell, I examined the larynx of Mrs. C., age 23, about the 14th February last. Has lost her voice sixteen months ago, and since then speaks in a whisper. The aphonia was about a fortnight coming on, and two or three weeks afterwards she began suffering from pain in the throat. She attended two of the London general hospitals without obtaining relief. Began coughing about three years ago; frequent hæmoptisis in streaks. Mother died young from consumption. Menses regular for the last three months; at present complete aphonia, and feels in the throat as if a foreign body was present, requiring removal. Is subject to occasional distressing spasms of the glottis on coughing. A laryngoscopic examination shows the presence of a cluster of vegetations on the posterior part of the

larynx, and adhering to a raised patch of mucous membrane; epiglottis healthy.

Phys. signs: At the base of the left lung, a shade of dulness, and crepitation without respiratory murmur. On the right side, slight tubular breathing at apex in front; and at the back, on the same side, some tubular expiration at apex. These signs, together with slight falling in of the chest at right apex, and a shade of dulness under clavicle, detected subsequently, left very little doubt as to the tuberculous nature of the disease. Pulse 88, normal; temperature in mouth, 100°3. F. She was treated with the application of a solution of chromic acid to the larynx, and the administration of cod-liver oil, with syrup of iodide of iron, and later, syrup of phosphate of iron with quinine. Under this treatment the growths diminished in size, assuming the appearance of the crown of a molar tooth. The general disease, however, was not, by the end of April, stayed in its progress.

In the present case the aphonia was due to the thickened patch between the arytenoid cartilages preventing their mutual approximation. The patient began coughing about three years ago, but only lost her voice sixteen months since, so that the disease in the chest appeared to precede that of the larynx.

Dr. Chas. J. B. Williams and Dr. Chas. Theodore Williams have shown, in a series of admirable communications to the *Lancet* (1868), that consumption is a disease which may be cured, or, at all events, arrested, with return to perfect health, and they have brought forward a number of cases occurring in their own practice as illustrating the fact. In instances of this kind, where the larynx has been affected, we may expect to find, with the Laryngoscope, certain patho-

logical conditions symptomatic of the former disease. It is thus that I account for certain appearances I have seen in the larynx, where symptoms of tubercular disease of the lungs had formerly existed. I have preserved notes of one of these cases, of which I shall offer a brief account; it is, however, I must admit, in no way conclusive, although not devoid of interest.

Case.—Miss V., aged 30, consulted me while on a visit at Geneva during the last summer recess. Two winters before she resided in Russia, where, after much reading aloud, she began to suffer from a sensation of irritation or heat in the throat, together with occasional hoarseness. Some months later she had several attacks of hæmoptisis. The pain in the throat continued increasing from January to May, 1866, when she took the waters of Ems, from which she derived much benefit. She spent the winter 1867–68 at Nice, where she took cod-liver oil, and her general state of health became much improved. The laryngeal pain, however, never quite left her, although now much less severe. At present her voice is fair in every respect, but she cannot sing, and, after reading or speaking for a short time, her power of phonation becomes exhausted. Phys. signs of the chest: harsh breathing both sides, but percussion-note quite clear. I obtained a good view of her larynx, and distinctly saw what appeared to me as a cicatrix in the posterior supra-glottic region, and looking like a white linear induration slightly raised. There was no redness or appearance of inflammation near it, and the larynx was perfectly sound in every other respect. She says she constantly feels in the throat as if there was a foreign body adhering to it, which her efforts prove ineffectual to dislodge. Deglu-

tition quite easy, but some pain in the larynx when she swallows food seasoned with pepper or vinegar. In other respects general health now good. We can do no more than surmise that, in the present case, there has been tubercular mischief in the larynx; there is no proof of it, but it may be concluded from the history of the illness that the patient suffered formerly from some acute affection of the larynx; the question is, as to whether its origin was tuberculous or not. I treated the case with the application of a solution of nitrate of silver to the larynx, frequently repeated, from which she derived much benefit.

Prognosis from the Inspection of the Larynx in Laryngeal Phthisis.

This is a very important subject, as an opinion will be asked, in most cases, as to the probable course and termination of the disease. I should say that, in cases of chronic phthisis with a normal pulse, temperature of the body not above 99° F., and no progressive loss of flesh, the prognosis will be so far favourable that the disease may be considered capable of much relief by treatment, and be no longer perceived by the patient, who practically may consider the affection as cured for the time. I doubt whether a tuberculous condition of the larynx, even in the most satisfactory cases, can be treated so successfully as to remove all signs of the disease. In one case of tuberculous thickening of the epiglottis, reported above, for about six months the patient had every reason to consider himself cured of the laryngeal phthisis; still, the granular appearance of the part, seen with the Laryngoscope, did not entirely dis-

appear, and he suffered from a relapse. Laryngeal ulcerations with aphonia do not, as a rule, allow of a favourable prognosis, although an improvement in the throat and voice is not unlikely to take place from local and general treatment. So long as the condition of the lungs remains chronic laryngeal ulcerations will show a tendency to heal rather than to spread; but should active pulmonary symptoms set it, with the well-known disturbance of the general state of health invariably met with in acute phthisis, the laryngeal ulcerations will increase in size and in number. Hence the importance of directing the treatment not only to the larynx, but also to the relief of the constitutional disorder.

Fortunately, tuberculous affections of the larynx do not usually assume the ulcerated form; and, notwithstanding the many cases of laryngeal phthisis I have met with in my hospital practice, I have seen but few instances of actual ulcerations. It is true I have occasionally met with apparent loss of substance of the mucous membrane of the larynx from softening, where the secretion of the white mucous substance was very abundant, but these were not cases of laryngeal ulcerations.

When the tuberculous epiglottis loses its soft injected and swollen appearance, and becomes hard, pale, and granular, the laryngeal disease may be considered as progressing favourably. The thickening gradually diminishes, though not, I believe, from the absorption of the tuberculous matter (which does not disappear), and at last the epiglottis is seen to consist of no more than a hard cartilaginous substance infiltrated with tubercular granulation. This favourable change can only be expected to occur in the

chronic stage of the general disease. In the acute stage, life may be destroyed ultimately by inability to take food; but in these very distressing cases, I now fully believe that the fatal termination from starvation may be averted, and life prolonged for some time by local treatment of the larynx.

Tuberculous vegetations in the larynx are difficult to treat, but admit of improvement, although relapses may take place; and just as the growths are decreasing under the influence of the treatment, diarrhœa may set in, with acute phthisical symptoms, and the laryngeal disease breaks out afresh.

In conclusion, laryngeal phthisis should be considered as a symptom of consumption; but now that we can have direct access to the larynx, it is in our power to mitigate and relieve any tubercular disease in that portion of the windpipe.

Remarks on the Pathology and Treatment of Tuberculosis.

With respect to the theory of the nutrition of tissues, none has hitherto been accepted generally by the profession; some authors conceive that the blood distributes the nutritive material throughout the body by a process of exudation, the tissues, or anatomical elements, remaining passive; according to others, the blood actually imparts life to tissues, which life enables them to take up from the circulating fluid the substances they require for their nutrition. Without entering at present upon the merits of these two theories, I propose to accept the last, which, to my mind, is far more likely to be correct than the first.

Under ordinary circumstances of health, there is a mutual reaction between the blood and tissues, which

is productive of healthy structures; but should the functions of either the one or the other of these sources of action be modified, the result will be a defective or altered nutrition. The principal condition for the maintenance of the healthy functions of tissues is a free capillary circulation. In cases of inflammation, where the capillary circulation is interfered with in some particular part of the body, the normal nutritive functions at this spot cease to exist; new vital forces are now exerted by the inflamed tissues, which cause them to be abnormally nourished by the blood circulating through their substance; hence the formation of morbid products. These abnormal vital forces will depend on many circumstances, but in a great measure upon hereditary predisposition; where there is no hereditary or other tendency to any particular morbid state, the inflammation may subside before the abnormal reaction has begun to take place. In some cases there is a predisposition to the formation of pus, and then we have an ulceration, or softening, and an abscess; or there may be a predisposition to erysipelas, or to the secretion of serous fluid, or to any other affection known to be the direct result of inflammation. Now one of these results of inflammation I conceive to be the formation of what is known as tubercular matter. *Tubercular matter* I believe to originate with the usual phenomena of inflammation, the grey granulation, or, at all events, the material for the very first formation of tubercles, being taken from the blood by an abnormal power of tissue. In consumption the microscope reveals the deposit of fresh matter in the pulmonary air-cells; this new matter must be supplied from the blood, which has nearly or entirely come to a stand-still in the

capillaries permeating the diseased tissue. According as the blood is mal-assimilated by the tissue, the capillaries receive a fresh quantity of this fluid, which keeps on the supply of material for the tubercular formation.

Pulmonary inflammation must begin with a sluggish circulation at the lungs, leading to congestion; hence there is present an abundant supply of material for the formation of morbid products, and the high state of vascularity the lungs are susceptible of assuming, is not unlikely to be one of the causes to which pulmonary tissue owes its peculiar liability to tubercular deposits. The formation of tubercular matter in the other parts of the body, such as mucous membranes and lymphatic glands, I consider as due to the same cause: I mean, to an altered condition in the vitality of the tissue, originating with inflammation, and then followed by an abnormal function residing in the tissue and exerted upon the blood.

Assuming this to be the explanation, so far as it goes, of the formation of tubercles, the prophylactic treatment of the disease will be to prevent inflammation on the one hand, and improve the healthy vital functions of tissues on the other; and, indeed, this is precisely what we know to be the best means of preventing consumption with those naturally predisposed to it; so far, the theory and the physiological circumstances bearing upon it agree. When the disease is fairly established, according to the present view, the rational treatment will be to remove from the parts affected the supply from which the morbid material is obtained, or, in other words, empty the capillaries in the diseased tissue. Nature occasionally effects this in pulmonary consumption, when, an attack of hæmoptisis removing from the lungs the blood which filled up the capillaries, and

which had nearly ceased circulating, the disease appears for a time arrested, and, occasionally, a remarkable state of improvement ensues. Fresh blood being admitted into the capillaries, the normal vital force of the tissue is again called into action; but the primary deposit, unless it should be absorbed, becomes a cause of irritation and inflammation, constantly present, which may at any time cause a return of the disease. If the lungs could be attained, and blood drawn directly from them in the earliest stage of phthisis, this would be, I believe, the best treatment; but it cannot be done, and as a substitute we apply leeches to the chest, or endeavour to cause a derivation of blood from the lungs by counter-irritants, and other means having the same object. Dr. Pollock, in his most valuable and elaborate treatise on the 'Elements of Prognosis in Consumption,' observes (p. 399), 'Local depletion cannot be too strongly urged as the necessary, if not the sole, mode of relief in the early days of a declared deposit in the lung, with irritative fever. . . . . A few leeches, followed by the cupping-glass over the seat of dulness, saline medicines, perfect repose, and a non-stimulant diet, offer the best chances of ensuring quiescence of the deposit which has already taken place.'

Let us now consider laryngeal phthisis. I believe this affection must be preceded by irritation and congestion of the larynx, assuming the character of common laryngitis. The blood accumulated in the laryngeal mucous membrane is the source of the material from which laryngeal tubercles are formed. Gradually the parts become more and more swollen, blood slowly flowing through the capillaries, which the tissue takes up and converts into tubercular matter.

No substance is yet known which, being directly applied to a part undergoing tuberculization, causes a return of normal nutrition, iodine being the only agent which appears to retard in some degree the progress of the disease. But thanks to the Laryngoscope, the larynx is now within our reach, and we can scarify it and let out the blood which, collecting and accumulating within its mucous membrane, yields material for the formation of tubercles. By this process, laryngeal phthisis, if treated during the chronic stage of consumption, may be, I believe, considerably checked; my experience, so far, certainly justifies this treatment, which I have seen attended with marked benefit. The amount of blood trickling out of the punctures is but very small, and need not alarm the Practitioner. I was at first rather sparing of the scarifier, lest I should weaken my patient by loss of blood, but soon found out that there need be no such apprehension. It is remarkable that the first punctures bring out most blood, although it be but a few drops; very little, or perhaps none, can be obtained afterwards at the same sitting, as far as the epiglottis is concerned; it is obviously more or less blanched from the operation, showing the very slow rate at which blood flows into the diseased parts from the general circulation.

The operation of scarifying a tuberculous epiglottis shows that this organ has lost its soft flexible nature, and has become harder as it contracts.

My remarks on the pathology and treatment of phthisis have, I trust, shown that in the Laryngoscope we have an invaluable means of advancing our knowledge of the pathological and clinical history of tuberculosis, and of grappling with this fearful disease when it has attacked the larynx.

LONDON: PRINTED BY
SPOTTISWOODE AND CO., NEW-STREET SQUARE
AND PARLIAMENT STREET

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